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95th Congress }
2d Session }

COMMITTEE PRINT

ALASKA NATIONAL INTEREST LANDS WORKSHOPS

PRINTED AT THE REQUEST OF THE

COMMITTEE ON ENERGY AND NATURAL RESOURCES
UNITED STATES SENATE

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MEMORANDUM OF THE CHAIRMAN

To Members of the Senate Committee on Energy and Natural Resources:

The Alaska National Interest Lands legislation raises some of the most significant issues to confront the Congress in many years.

Over the past several years, the committee has conducted numerous hearings, briefings, workshops, and business meetings on these issues and the so-called Alaska (d)(2) legislation. In February of 1978, the committee majority and minority staff conducted a series of workshops in Anchorage, Alaska, designed to solicit the views of a wide variety of interest groups and agencies on a wide variety of resource issues. Representatives of numerous Federal agencies including the Department of the Interior, Heritage Conservation and Recreation Service, Bureau of Mines, Bureau of Land Management, Geological Survey, National Park Service, Fish and Wildlife Service, and the Forest Service were invited to participate. Similarly, several State agencies including the Alaska Department of Natural Resources, Alaska Department of Transportation, and Alaska Department of Fish and Game were represented. In addition, a number of interest groups—the Alaska Miners' Association, Alaska Loggers' Association, Alaska Oil and Gas Association, and the Alaska Professional Hunters Association participated in these workshops.

Finally, the various Native Corporations and the Joint Federal-State Land Use Planning Commission were invited to participate.

These participants were brought together to discuss a range of resource values and potential for each of the areas under consideration for Federal designation. These included scenic values, wildlife resources, renewable resources such as timber and fisheries, subsistence resources, the non-Federal lands issue, energy and mineral resources, and transportation/access concerns.

These workshop sessions pull together a wealth of information on Alaska's abundant resources. As the Congress continues to make decisions affecting the classification and designation of Federal lands in Alaska, this information will be a useful addition to the public debate. Therefore, I have directed that the record of the workshops be published as a committee print for the use of members of the committee, other Senators, and interested citizens.

Many of the maps and additional materials utilized at the workshops and submitted for the record could not be included because of reproduction and duplication limitations. All of this material, however, has been retained in the committee's official files.

I commend this committee print to anyone concerned with the (d)(2) lands issue.

HENRY M. JACKSON, *Chairman.*

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ALASKA NATIONAL INTEREST LANDS WORKSHOPS

MONDAY, FEBRUARY 13, 1978

ANCHORAGE, ALASKA

Mr. HARVEY. I want to welcome everyone to this first session of the Staff Workshops on the Alaska National Interest Lands, and as you obviously are aware by this time, this is not the world's largest room or the world's smallest crowd. We may have a different room tomorrow. We're not sure. If we do, it will be a bigger one, let's put it that way.

A couple of ground rules before we get started. First of all, I'd like to introduce myself. I'm Mike Harvey, the chief counsel of the Senate Energy and Natural Resources Committee and with me here are four other members of the committee staff: Steve Quarles, counsel to the Public Lands and Resources Subcommittee; Tom Williams, professional staff member for the Parks and Recreation Subcommittee; and Tony Bevinetto and Tom Imeson, professional staff members for the minority. The purpose of these workshops is solely to gain information about resources and uses in the various areas that have been proposed in one piece of legislation or another for designation in the four systems—National Park, Wildlife Refuge, Wild and Scenic Rivers, and Forest Systems. This legislation, of course, arose from section 17(d)(2) of the Alaska Native Claims Settlement Act.

Contrary to some reports that I've heard since arriving here last night, this is not a public hearing of the committee. This is not a meeting for the purpose of getting the views of any or all of you on such issues as how to provide for subsistence use of Alaska lands, access problems, mineral development, et cetera, but rather to get a look at each of the areas in some detail and get your views about what the resource values are that are there and why you think they're important or not important. The purpose, from the committee's standpoint, is to enable it, after it has made decisions about what the policies may be, on some of the issues that I just mentioned, such as subsistence, sport hunting, mineral development, to have the background available so it can make more rational decisions about where boundary lines of a specific area, might be drawn or whether a certain change in standard park or wildlife refuge use rules might be considered for that particular area.

Our reporter today tells me that these microphones are very sensitive, so please don't slide your papers around as people talk. I think it may help her some if, on the little cards you have in front of you, you write your names and turn them so that she can see them, as well as those of us up here. It's going to be a very difficult job for her to keep track of who is talking at a given time. One thing that will help is if only one person talks at any one particular time. I will make some effort to keep that rule in operation. And she would love it if you would remind us each time you speak, who you are so that the name will appear properly in the record.

Since we are pretty crowded in here, and like all buildings in Alaska, this one seems to be overheated, I would, in my role as the staff chairman, impose a no smoking rule in this room. If you have to smoke, then please step outside.

What we are doing here today is, again, for a little bit of background, really the fifth step in the committee's consideration of the (d)(2) lands issue. We held hearings for 2 days last summer on Alaska resource issues in general and some (d)(2) lands issues in particular. We have had three hearings on individual bills that are up before the committee. Last summer, some of the members of the committee and staff members conducted a 2-week field trip here in Alaska. In September, Mr. Quarles and Mr. Imeson conducted workshops in seven villages to talk about specific issues of concern to the Natives. Those workshops are step five.

The next steps down the road from here, for those of you who are interested, will be hearings by the committee on the basic issues involved in these bills—hopefully, focusing in the individual hearings on some of the individual resource development or nondevelopment issues which I've mentioned earlier. Then, of course, we would to go committee markup. Everyone wants to know the timing, but we're not sure at this point. I would assume that within the next month, we will have the general hearings. If by mid-April or first of May, the House has actually passed the bill, it will be my expectation that the committee will work on the House-passed bill. On the other hand, if, by that time, the House has not passed the bill, I believe the committee will simply start its work without the benefit of the House-passed bill. It will, of course, know at that point what the House has done. The committee knows now what the House has done in subcommittee and I assume they'll at least be finished with their committee work over there.

I'm going to turn this over now to Steve Quarles, who is going to set the stage here and make sure that we get the right folks at the table at any particular time. I'd make one other point, and that is that, if you recall from the letter that we sent out, that we do intend for each group to make its own judgments about who it is you want to have representing you at the table at a particular point in time. We assume that some folks may have several people here, some of whom may be knowledgeable about one particular area and others about another area. So feel free to rotate those people, so to speak, on your own. That's a judgment that we're going to let you make, as to who knows the most about these situations. And once again, I would remind you that we are here to talk about the resource values, both present and prospective, and not really to debate some of the major issues that already have been debated at great length and I'm sure will continue to be debated for some time to come. Steve.

Mr. QUARLES. Thank you. The first thing that I would say simply is bear with us. This is an experiment for us as well as it is, I'm sure, for you and we're going to try to make this as meaningful as possible. We hope to keep the workshops as informal as possible. We would hope that there would be communication across the table between the various participants and not simply between the committee staff and participants. We sent out invitations and made it clear that we would like one chair filled by each group which receives an invitation. As Mike said, you cannot only rotate people in and out of the chair as different areas are discussed, but, if you have a specialist on one particular resource in an area, there's no problem bringing him or her up to the table for discussion of that particular resource.

We are going to start out with a presentation from Richard Stenmark from the Commission introducing each region. He will identify various areas that are the focus of the various (d)(2) lands proposals and we would plan to take up each area in turn to discuss the various resources and uses in seven broad groupings. The groupings are:

Obviously, we're going to be in quite a bit of hurry to push through the discussion of each area and resource, so I can only urge you to be as succinct as possible. The principal reason for these workshops is not necessarily to gain new knowledge or new opinions, because certainly all the knowledge and opinions have already been recorded or expressed somewhere, I'm sure. The purpose is to present facts and opinions in as succinct a form as possible and highlight the important resources and values so the members of our committee can read in one place, the best information. They will not have the opportunity to read all the environmental impact statements, all the resource assessments, all the massive materials—bookshelves—full of facts and opinions which are available. Instead, it is hoped that these workshops will transmit the best knowledge that we can obtain in the most consumable form possible for the members and staff of our members on the committee.

In the Department of the Interior, we have offered a chair to the Heritage Conservation and Recreation Service. Are they here?

UNIDENTIFIED VOICE. Yes.

Mr. QUARLES. The Bureau of Mines?

UNIDENTIFIED VOICE. Here.

Mr. QUARLES. The U.S. Geological Survey?

UNIDENTIFIED VOICE. Here.

Mr. QUARLES. The Bureau of Land Management?

UNIDENTIFIED VOICE. Here.

Mr. QUARLES. The National Park Service?

UNIDENTIFIED VOICE. Here.

Mr. QUARLES. And the Fish and Wildlife Service?

UNIDENTIFIED VOICE. Here.

Mr. QUARLES. We also have invited the Forest Service of the Department of Agriculture.

UNIDENTIFIED VOICE. Here.

Mr. QUARLES. From the State of Alaska, the Department of Natural Resources?

UNIDENTIFIED VOICE. Here.

Mr. QUARLES. Department of Transportation?

UNIDENTIFIED VOICE. Here.

Mr. QUARLES. And the Department of Fish and Game?

UNIDENTIFIED VOICE. Here.

Mr. QUARLES. From the Native Regional Corporation, I believe this morning it would be Calista. Are you represented here?

[No audible response.]

Mr. QUARLES. And Doyon, someone from Doyon? If you can find a chair up here, you should come on up. There's one right there. In addition, the Alaska Coalition?

UNIDENTIFIED VOICE. Here.

Mr. QUARLES. The Alaska Miners' Association?

UNIDENTIFIED VOICE. Here.

Mr. QUARLES. The Alaska Loggers' Association?

UNIDENTIFIED VOICE. Here.

Mr. QUARLES. The Alaska Oil & Gas Association?

UNIDENTIFIED VOICE. Here.

Mr. QUARLES. The Alaska Professional Hunters Association?

[No audible response.]

Mr. QUARLES. Dick Stenmark.

THE WESTERN REGION

Mr. STENMARK. Thank you. I think I'll move my first prop out into the area here. In order to bring a little bit of order to the presentation of resource materials, we've broken up the State into different regions. These regions are not sacred, by any means, and we have attempted to delineate areas that tended to have some interrelationships within themselves. On the other hand, you will find areas that kind of overlap, so I think that in the presentation of certain kinds of things you will have to go over the purple lines a little bit. I'll just go over these regional lines quickly for you, though, so you can be thinking about them. The northeastern region here will basically be the area from, more or less, the pipeline corridor on over to the Canadian border, and from the crest of that Yukon/Tanana Uplands, then, on up to the Arctic Ocean here. So that basically contains a section of the Arctic region, the Eastern Brooks Range, and the Yukon River. Northwestern Alaska, for these purposes then, will basically be the area west of the pipeline haul road, the rest of the Arctic and the Western Brooks Range, the Koyukuk Drainage and the Seward Peninsula. The southeastern region, which is just off the map, will be from Yakutat on southeastward. The central region, in this case, includes the Yakutat area, over to and including the Kenai Peninsula, the Alaska Range and the Tanana Valley. The southwestern region will include the drainages around Bristol Bay, the Kodiak Island group and the Alaska Peninsula and the Aleutian Islands.

The western region, which we'll be looking at this morning, then, is in this zone here. The western region encompasses the middle and lower Yukon River and just about the entire Kuskokwin River drainage. This is an area of about 71 million acres altogether.

There are no major mountain ranges in this particular zone, but there are some extensive mountains in the Nulato, as well as the Ahklun and Kilbuck Mountains and the Kuskokwim Mountains. This zone, other than the areas above the treeline, is boreal forest, a mixture of white and black spruce, aspen, birch and so on. But out on the western end here, the forest gives way to a tundra zone. The Yukon and Kuskokwim Rivers, as you know, are the largest rivers in the State and this delta out in here then is also the largest delta in the State of Alaska. It's an area with an awful lot of water. There is considerable flood plain along these major rivers, an awful lot of ponds and out in this area the water surface is perhaps about equal to the land surface.

There are over 50 villages, primarily in the delta area here, with about 20,000 people and although that seems somewhat concentrated, it's still very sparsely populated. The people who live out mostly in the coastal or the delta area here are Eskimos and, on up the Yukon and in toward the interior are mostly Athabascan Indians. Upon completion of the Native Claims Settlement Act and the conveyance of lands to the natives, they'll have approximately 15 percent of the region, or about 10 million acres of private ownership. The State selections in this area total about 17 million acres at the moment and, of course, the State has some additional selections to make, but that selection will primarily be east of 161 degrees, west longitude. The State relinquished selection rights to the western portion of that some years ago. There are four existing national wildlife refuges in this region. There are three units to the Clarence Rhodes National Wildlife Refuge. The smaller, Hazen Bay Refuge right here, the Nunivak Island Refuge and out here in the Bering Sea, the Bering Sea Wildlife Refuge around Saint Matthew Island.

The (d)(2) focal points in this region are primarily the Yukon/Kuskokwim Delta, the Innoko-Kaiyuh area, and the Nowitna area. A small portion of the Koyukuk area is located here too, but we'll deal with that in northwestern Alaska. I believe that's all I have at this moment.

Mr. QUARLES. We have had identified for us three areas which we'd like to concentrate on this morning: The Yukon/Kuskokwim area, the Innoko-Kaiyuh area, and the Nowitna area.

YUKON-KUSKOKWIM AREA

Scenic, Landscape, Historic and Archeological Values

Mr. QUARLES. Let's begin by asking if anyone would wish to identify for us what they regard as the particular scenic, landscape, historic, or archeological values of the Yukon/Kuskokwim area. Those values that would warrant that any portion of the area should be designated for protection of such values. Again, we don't want to know how the area should be designated, what the boundaries should be, or things of this nature, as much as we just simply want to have identified those values.

Mr. HESSION. Mr. Chairman, I'm Jack Hession with the Alaska coalition. I'd like to ask a general procedural question before we begin. The coalition notes that the committee intends to look at wilderness in southeast Alaska. We're wondering if they also intend to consider that with regard to the existing national parks and refuges. In this region, of course, we would have Nunivak in that category. Can you tell us how you're going to deal with that? For each one of these regions, can we speak to the wilderness values of existing parks and refuges?

Mr. QUARLES. Yes; you can.

Mr. HESSION. Thank you.

Mr. QUARLES. Does anyone want to address the question?

Mr. REFFALT. Mr. Chairman, my name is Bill Reffalt, of the Fish and Wildlife Service. Specifically dealing with the lower portion of the Yukon/Kuskokwim Delta, one would say that the scenic values there are unique in the sense that you have a great expanse of flat terrain mixed with large amounts of water, as Mr. Stenmark has indicated. Very little relief, and therefore in most people's viewpoint, a lack of scenic attraction. I think the people who live there, however, feel that the area, in terms of its uniqueness, provides a scenically unique area that is worthy of note. In the northern portion of the area, the Andreafsky River drainages, the low hills and mountains associated with that, I think one would say, do offer a good scenic attraction for this region. The low hills in the very southeastern portion might also be termed of average scenic quality. On Nunivak Island, itself, there are a variety of resources, lava fields, small mountains, cliffs along the edge, sand dunes along the southern side of it, so there is a variety of various scenic features associated with the Nunivak area. That would be a general summary of the scenic resources.

Mr. GORDON. My name is Richard Gordon, I'm a resource consultant. I am here with the Alaska Coalition. I will discuss the scenic landscape values of Yukon Delta and Nunivak briefly. Let me point, first of all, to a map which has been placed on the upper-right-hand wall. Mr. Stenmark did not mention this. This map was prepared under contract to the Land Use Planning Commission as part of a study to analyze landscape values and resources in the entire State of Alaska. It is based on design criteria and the entire study, including three maps, will be submitted in due course to the staff. For the moment, unless somebody around the table has questions, I will just deal with the substance. I am making the assumption that landscape values are a resource. I will also, where it seems appropriate, briefly discuss wilderness as a resource. This is wilderness with a small "w." It has no political implications, and I'll try to be very careful as to where I apply it.

In the Yukon Delta addition, the vast expanse of ponds and marshes in a tundra and low brush situation, as Bill has said, is the primary visual value. As you come toward the delta, you have the tributaries of the major rivers, which are quite a different type of landscape, where the predominance is sloughs, winding, moving waters, rather than ponds. The coastal portion of the existing delta has one particularly interesting area of spits, sand spits, barriers, bars, adjacent to probably one of the most productive parts of the entire flats in terms of waterfowl and bordering the Askinuk Mountains, which break off at Cape Romanzof in the high cliffs above the sea.

Briefly, Nunivak Island has three primary landscape areas of value, the northwestern corner at Cape Mohican, which is one of the great bird colonies of North America. It's a large, volcanic cliff that drops off into the sea. The second value is the area around

Mount Roberts, which is a low volcanic field with many potholes, crater lakes, ash cones, and the like. Immediately south of that area, along the southern tip of Nunivak Island is an extensive area of spits, sand flats, and some of the most significant active sand dunes in Alaska, the Cape Mendenhall dunes. Those are probably the three primary visually significant areas on Nunivak. They perhaps are also the three areas that could be considered as being the least traveled and used in terms of the reindeer and musk ox management. On the uplands of the delta, two areas. First, the Andreafsky area, which is part of the Nulato hills. While that area was chosen for refuge because of the Bristle-thighed curlew and the other wildlife values, the nature of the hills are even, fairly low, rolling hills, open tundra on the top, forest on the slopes, they tend to be rather marshy along the river bottom, very fine-textured in nature, more so than most any other area of Alaska. In other words, the hills are even, rolling to the horizon, very close to one another. The river valleys are narrow. The main trends are parallel to one another. The tributaries are perpendicular to the main trends, giving a trellis sort of pattern. It's a very patterned, subtle-textured sort of landscape. The Andreafsky drainage is also one of the areas in southwestern Alaska that most has the wilderness characteristics. Except for the lower 15 or 20 miles, there is very little use of that area by anybody for anything.

The other visual area of importance is on the southeastern side of the delta. I might comment as background that the area I'm talking about, the Kisaralik River drainage, is in the Togiak proposal in S. 1500, however, it drains into the Kuskokwim, it is part of that area primarily relates to, No. 1, the wilderness resource subcommittee print, the Kisaralik drainage was proposed for placement in the Yukon Delta. The upper part of the Kisaralik watershed includes the Ahklun and Kilbuck Mountains. The significance of that area primarily relates to, No. 1 the wilderness resource there. This is one of the two largest usable areas of small water wilderness in the southern half of the State of Alaska. It is an area where there is simply very little settlement, except for the lower 30 miles or so of the Kisaralik River. No evidence that I could see, at least, of human use. The visual characteristics of the Kilbuck Mountains, which are the northernmost of the two ranges, are extensive, broad rolling uplands, 3,000 to 3,500 feet, which break off very sharply into the tundra lowlands. The Ahklun Mountains, immediately to the southwest, we'll discuss more in detail with the Togiak Mountains—I mean, with the Togiak proposal. But basically they are more narrowly compressed, more rugged block mountains, which are spaced at rather wide intervals across a plain, giving a sense of space and openness and the higher peaks are eroded into block shape, that is, steep rectangular shaped pinnacles. They're not pointed, they're block shaped, which is rather unusual topography.

The Kisaralik River drainage is rather unusual in that it leaves the Ahklun Mountains, crosses a rolling tundra plain, dissects the Kilbuck Mountains through a deep canyon, which it leaves at a place called Golden Gate Falls, one of the more impressive places in Alaska. That Kilbuck Mountain region, then, goes rather abruptly into the eastern part of the Yukon Delta, which is forested. It is in contrast to the western part, which is tundra. Thank you.

Mr. WELCH. Yes, Mr. Quarles. I have a question on inserting values for the wilderness rivers, and in one outline, maybe we could address that as a separate topic by itself.

Mr. QUARLES. Again, I just want to point out that we——

Court REPORTER. Excuse me. What was that gentleman's name first?

Mr. WELCH. Bill Welch, Heritage Conservation and Recreation Service.

Mr. QUARLES. Again, we want to point out that what we're interested in here are the values, themselves. We're not talking about which system they should go into necessarily, so that such things as wilderness values, wild and scenic river values, park values, et cetera, we will hope that they will be talked about in terms of landscape values, wildlife habitat values, these kinds of things. But, this is an informal meeting, so if you feel it doesn't fit in one of these resource categories, say, well, feel free to address it.

Mr. WELCH. OK. I think perhaps that would be the best place to insert the information that we've collected in our data gathering for wild and scenic rivers and it really is a summary over the first two categories, which would be the wildlife and also the scenery and I think in the areas we're addressing now, that the Andreafsky and Kisaralik both are and will be addressed by other gentlemen quite extensively, but certainly it is those values within those two rivers that would contribute to the recreational use of those rivers. There are the spruce forests, the excellent fishing in those rivers. There are some minerals that are collected by people using the rivers as float streams, and also the big game on the Kisaralik make that important for the recreational user. Thank you.

Wildlife and Fish Resources and Uses

Mr. QUARLES. The next topic is the wildlife resources and uses. First, we'd like anyone who'd be interested in identifying waterfowl and animals that exist in this area, their important habitats, if they are, and then we would go to use patterns, subsistence, commercial, and sport hunting and fishing.

Mr. HANSEN. Dave Hansen, Department of Natural Resources, State of Alaska. I would just like to refer to two things. We have provided computer printouts of the summaries for each of these areas, for all the different values you're talking about, with the exception of scenic, which are at your disposal and I will be referring to those very briefly throughout the next few days, or our representative will. Also, we will put out, as we talk about each area, a map of 1 to 250 scale that is color coded. You can refer to the map on the corner wall over there. It has colored in just generally your resource areas. And as you see, for the entire Yukon Delta area, it is not a real high value area from many standpoints. But addressing the particular subject right now, on wildlife, our statewide assessment would rate a good part of the Yukon Delta area extremely high for wildlife habitat. In fact, looking at the total State, 4 million of the top 26 million acres of the

State for wildlife habitat fall along the Yukon River as it goes out through the Delta, so the statewide assessment would rate it very high, with a significant portion of the top 10 percent of the habitat land in the State located here. Thank you.

Mr. BARTONEK. Mr. Chairman, James Bartonek, Fish and Wildlife Service. The lowlands of the Yukon Delta and their water relationship are perhaps the primary reason for the area's importance to migratory birds, especially water oriented birds. The Delta, essentially, has two different aspects. Actually it's fresh water intrusion from the river systems and back in the very coastal area, south of the mouth of the Yukon River, which is salt water, and it provides essentially two different types of habitat, which have two different species compositions.

It's extremely important, these lowlands, from the standpoint of waterfowl production. It's been estimated that 2.3 million ducks are produced in a fall flight, up to about 700,000 to 800,000 geese and brants and about 50,000 swans. The true importance of this production perhaps is best measured by the people that use them. The people on the Delta, of course, are important users of that resource, as are those in States and Provinces along the areas through which the birds migrate. Probably the bulk of the goose production will end up in the lower portion of the Pacific flyway. The States of Washington, Oregon, California and to lesser degrees, Idaho and Nevada and further east will benefit by this production. A majority of the pintails that winter in California and in Mexico are produced in Alaska, of which a sizable percentage of them are produced on the Yukon Delta.

The shorebird population, one which is largely unexploited, is perhaps even more spectacular than the waterfowl population, numbering possibly 200 million birds in a fall flight. These figures that I give you can vary considerably from year to year. A case in example was last year when drought conditions throughout the prairies and parts of the western States forced many species into Alaska and particularly birds like pintails, widgeons, canvasbacks, were found in large numbers throughout the State and even westward into habitats where they may not normally be found, such as on the Yukon Delta.

As was mentioned, there are a few marine bird colonies, spectacularly large ones, numbering in excess of 100,000 birds on Cape Mohican on Nunovak Island, and a couple of small cliffnesting colonies at rock outcrops on the Delta. The Delta's real value, again, comes from many of the ground nesting birds that will nest on the offshore islands and spits, the terns, the gulls, but from an economic standpoint, perhaps the waterfowl population has the greatest value. Nunovak Island has a muskox herd which is of local statewide and National importance. The fur animals on the Delta are again of local economic importance to the residents, as is the run of anadramous fish through the Delta, of very great economic importance to fishermen, regardless of where they catch them. That would be the end of my comments.

Mr. QUARLES. Go ahead, Steve.

Mr. SILVER. This for anybody. Could somebody tell me the game species that are resident as opposed to migratory game species that also are found in these areas, both lowland and upland?

Mr. BARTONEK. As far as birds go, the resident species on the Delta would be the willow ptarmigan. Moving inland, you may run into, conceivably, some sharptail grouse or ruffed grouse, however, they would tend to be the exception rather than the rule. The ptarmigan, however, would be the predominant game bird, resident game bird. The raven although it legally is classified as a migratory bird, may tend to be resident, As far as all of the terrestrial mammals, they would certainly be resident.

Mr. QUARLES. Anyone else want to comment on both the variety of wildlife or their habitat?

Mr. SOMERVILLE. Mr. Chairman, my name is Ron Somerville, with the Alaska Department of Fish and Game. First a question, if I may, Steve. Is it possible to take, because of the human use aspect related with wildlife here, you mentioned commercial fisheries under renewable resources, as a request, we'd like to discuss that matter under the Fish and Wildlife. Do you have any objections to that?

Mr. QUARLES. None whatsoever.

Mr. SOMERVILLE. What we've done here also is try to, on your schedule, rotate people from the Department of Fish and Game in so you have essentially four people here, sport fish, game, commercial fisheries, and our "FRED" division, which is an enhancement development of our fisheries program, and first I'd like to call on Pete Sheppard, if I may, to take a seat and explain the resident species and human use aspects associated with that. Pete?

Mr. SHEPPARD. Mr. Chairman, my name is Pete Sheppard, I'm an area game biologist with the Department of Fish and Game, stationed out of McGrath.

By far the most important resident game species in the western area that we're considering would be the Alaskan moose. It's very important as a subsistence animal and also as a sport hunting animal. There are small populations of caribou and one fairly large herd, which is in the eastern portion of this area we're considering, called the Mulchatna herd, it migrates as far west as the Kilbuck Mountains and the upper Aniak River. There are other small scattered groups of caribou that can be found in the vinicity of the Yukon River, north of the Yukon, lower Yukon. We have some very large brown bear populations, some grizzlies. Most of those are found in the eastern portions of the Nushagak Hills and the Kilbuck Mountains, and the Kuskokwim Mountain area. I might mention that this area is probably one of the most productive fur areas in the State, very important for mink, otter, marten and the residents in this area depend quite substantially on the harvest of these species. I might say, too, that fox are a very important species. There are, at times, high populations of wolves in the area. Muskrats are a quite important fur species found on the delta in large numbers. Quite a bit of hunting is done by the local people for the snowshoe hare and the Arctic hare on what is commonly the delta. I think I must have covered everything I can right now.

Mr. QUARLES. Is there anyone else who would like to talk about either the wildlife, itself, or the use patterns, subsistence, commercial, sport?

Mr. CLINE. Dave Cline with the Alaska Coalition. I just have a few additional points to add beyond what Mr. Bartonek and Mr. Sheppard reviewed for you. I want to emphasize, existing fish and wildlife values are the most important resources being used in the region at this time and probably in the foreseeable future, primarily by the local residents. It's also important, I think, to recognize the dynamic forces at work on the Yukon/Kuskokwim Delta within a boundary very accurately identified, I think, by the Fish and Wildlife Service and called their area of ecological concern. Within the boundary of that delta, the primary high-value wildlife habitats are, of course, associated with wetland complexes, and there are many species there that are really wilderness dependent species. Not all of the waterfowl, but I believe the swans and geese particularly are dependent upon the wilderness setting in this complex and dynamic wetland community.

The wilderness criteria are remote setting, solitude, naturalness and, of course, the presence of wildlife and low levels of disturbance overall by man. The fishery resource, I think, deserves emphasis in that 3 to 6 percent of the yearly food supply in most villages comes from the five species of salmon and a few other fish that occupy principally the river systems on the delta. Commercial fishing is the most important industry now and probably for the foreseeable future on the delta, with at least 500 people or more now employed in the fish processing.

Just a few additional statistics in terms of the outstanding waterfowl resource, which of course is now recognized throughout the world because of the fact that many of the birds breeding there migrate to several continents and are protected under various treaties with foreign nations. Among the 2.3 million waterfowl in the fall flight from the Yukon/Kuskokwim Delta, 80 percent of the swans in the Pacific flyway are produced in this area. Nearly all of the white-fronted geese in the Pacific flyway, 50 percent of the continental population of black brant, 80 percent of the continental population of emperor geese and nearly 100 percent of the cackling geese, so this area is extremely important for geese and swans which, as I stated, are in my opinion dependent on a wilderness habitat.

The Andreafsky Watershed is the only extensive example of lowland tundra, boreal forest ecotone in this part of the State, in a relatively dry setting. It is habitat for the now very rare bristle-thighed curlew, along with fair populations of grizzly bear and moose. The Kisaralik area has some moose and grizzly bear, but it's particularly significant for its nesting raptor population on the upper river; namely, gyr falcons, golden eagles and rough-legged hawks. Thank you.

Mr. REGNART. Mr. Chairman, my name is Ron Regnart and I'm the regional supervisor for the Division of Commercial Fisheries, Alaska Department of Fish and Game, and I've worked in the lower Yukon area for the last 16 years. In terms of fisheries and resources, all five species of salmon both migrate and spawn in the lower Yukon areas and the area I'm speaking of, roughly between the delta, the mouth and Russian Mission. In terms of what most people regard as the resident species, there are whitefish, pike, burbot, grayling.

Even the so-called resident species make extensive migrations, some of them migrating from their lower delta rearing areas to upstream spawning areas of several hundred miles. Probably the only species, one of the few species that are truly resident, is the blackfish and the pike. Rounding out the list in terms of coastal species, we find the smelt, herring, trout, and cod, just to name a few. In terms of the commercial salmon fishery, the lower Yukon is the largest commercial salmon fishery in the State north of Bristol Bay. In recent years an average of about 800,000 salmon are taken by 849 commercial fishermen, and these are all, I might add, 1974 through 1976 average figures I'm giving you. Approximately 95 percent of these fishermen are local Eskimo people. In terms of economic value of the lower Yukon commercial salmon fishery, it's about $2 million and this does not include this last year's catch, which we estimate at about a $4 million catch in terms of fishermen's sales. In terms of wages earned by people working in processing plants, it's about $600,000, in other words, a direct income of nearly $3 million in terms of fishery generated dollars to the local areas. The wholesale value of the product has been about $6 million.

In terms of potential catch, we see encouraging signs of restrictions on the high seas through treaty negotiations between our Government and the Governments of Canada and Japan. We feel, with the reduced intercessions in the high seas, the potential catch in this area could approximate within 5 years, 1 to 1½ million fish, with a potential sales of 4 to 8 million, and with a potential wholesale value of $8 to $12 million, and we think that this is perfectly reasonable and could occur in the next 5 years. In terms of commercial potential for other species, the State is embarking on a new commercial herring fishery in the Cape Romanzof area. There's a 350-metric-ton limit established and we feel the herring fishery has great potential. Whitefish and sheefish represent a limited commercial potential. The sheefish study is presently being conducted, just started this fall, with the hopes of determining just exactly what the resource abundance is and potential value.

In terms of subsistence catch—again, these are the last 3-year averages, 1974 through 1976, in the area—the catch is 71,000. This is made by approximately 300 fishing families. I'd like to point out that when we talk about a subsistence fisherman, he's the same fellow as the commercial fisherman. The subsistence and the commercial fishery in this area is completely interwoven and it's conducted by the same people.

In terms of subsistence, catch documentation for the other species, we have very little information. As I've pointed out, we have a sheefish study underway. Whitefish are extensively used. We've conducted some surveys. In a single village, we know that it may take 6,000 to 10,000 whitefish in a single season for subsistence. Again, a similar study indicated that in one village, Saint Mary's, 4000 pike have been taken in a single season. The herring catch in the Yukon Delta, if you will, includes the Yukon/Kuskokwim Delta, is 80 to 100 metric tons, their subsistence catch of herring.

I would like to point out that the fish migrations and movement from this area are very extensive. Salmon that spawned in the area and passed through the area, reared in the area, spend a portion of their life cycle in the Bering Sea—as close as 50 miles from Kamchatka in Siberia and make upstream migrations through the delta, all the way into Canada, so there is a complicated management situation of international concern.

The major salmon spawning streams in the area of the Lower Yukon would include the Andreafsky. We have escapement counts of up to half a million chums and up to 2,000 to 3,000 kings in this area. Just about every clear water stream that doesn't freeze in the winter freezeout does receive salmon spawning runs in the area, and this would include the Tulurak River, the Punaluk River, the Pikmiktalik, the Pastoliak, Capo Creek, and Wilson Creek. The Department and the Division of Commercial Fisheries spends about $70,000 annually in research activities in the area and this includes test fishing at the mouth, and low-level aircraft surveys in the spawning streams, including landing access by float and wheeled aircraft and we envision potential activities would be a test fishing program at the middle mouth of the Yukon and sonar and weir sites to count the salmon escapements in the Andreafsky and the stream just north of Mountain Village. It's unpronounceable, at least I can't pronounce it.

There is one aquaculture site on the same stream at Mountain Village. It's a private hatchery that's been developed by the Native organizations. Thank you, Mr. Chairman.

Mr. QUARLES. We have a couple of questions here.

Mr. SILVER. Can you tell me to what extent the commercial fisheries operations take place within the areas of environmental concern as identified by the administration proposal?

Mr. REGNART. In terms of the Yukon Delta?

Mr. SILVER. Yes, in terms of this area here.

Mr. REGNART. Well, the entire commercial salmon fishery is within the confines of the Yukon River and——

Mr. SILVER. It's not allowed on the coast at all?

Mr. REGNART. Yes. There's a couple of spots, at the Black River, for example. It has a small commercial salmon fishery, and then the herring fishery is in the Scammon Bay Area.

Mr. SILVER. The second question I have, I didn't quite catch your description of aquaculture sites. You said there's one planned by a Native corporation. Are there any other future aquaculture sites that have been identified by the State or other Native corporations for development further on?

Mr. REGNART. Mr. Chairman, that's the only one that I know of. There are people in the room from our FRED Division that could maybe elaborate on that.

Mr. BEVINETTO. I have a question for the gentleman on the commercial fisheries aspect. Do you have comparative data on catch rates for the commercial species over the past years and any correlation between those catch rates and the habitat changes, if any?

Mr. REGNART. Mr. Chairman, we have a commercial catch records, going back to the 1930's and I'm not sure I understand your question. Is it, did we detect a change in the status——

Mr. BEVINETTO. Are there any guidelines being set on catch rates?

Mr. REGNART. The commercial fishery on the Yukon, although it's longstanding, has really developed, you might say, in the last 2 years. So, in terms of king salmon, it is a longstanding fishery. The catches now are maybe 15 to 20 percent higher than they were for maybe a 30-year period prior to statehood. Chum salmon is the biggest catch and still growing, because of the fact that the fishery, itself, is developing. But the habitat and fish runs here are in good shape.

Mr. BEVINETTO. Thank you.

Renewable Resources

Mr. QUARLES. The next resource is renewable resources which includes timber and agriculture, both crop potential and livestock potential. Go ahead.

Mr. GRAHAM. Mr. Chairman, I'm Hatch Graham with the Forest Service. With regard to the Yukon/Kuskokwim Delta, on the western part of the western region, the timber resource is pretty much nonexistent. Alan Epps, from the Cooperative Extension Service, can give you some information on agriculture.

Mr. EPPS. I'm Alan Epps with the Cooperative Extension Service. I think basically, rather than trying to throw out a bunch of figures on numbers of acres and so forth now, we will present a document later in the proceedings that summarizes these various things. Instead we'll talk about the general area, because I think it's the important issue here. The Yukon River Valley, upstream from Holy Cross, itself, has considerable agriculture potential. These lands, particularly in conjunction with some of the Native lands may be soon developed in the future. The Kuskokwim River Valley, itself, for about 30 miles upstream and downsteam around Aniak and then on up to the Aniak River another 20 miles or so have a considerable amount of agricultural soil which has been identified by the Soil Conservation Service in this area.

From Sleetmute on upriver and clear on over into the Tanana Valley, there is considerable agricultural potential in this area as identified again by the SCS. The Holitna River and the Hoholitna River system from Nogamut on the Holitna and just kind of swinging an arc across and then downstream to the Kuskokwim again has agricultural potential.

One of the things that I think needs to be recognized as we deal with the agricultural soils of these areas is, there are two kinds. There are the upland soils and there are the lowland soils. When we start talking about conflicts between various resource uses or complimentary aspects of these resource uses, I think these issues must be addressed and considered.

When you're talking about some of the lowland soils, you are infringing upon, in some cases maybe, the waterfowl habitats of the area. However, when you start talking about the upland soils, you're usually in a black spruce, spaghnum moss ecosystem with relatively no influence on the waterflow habitat and has relatively low wildlife habitat outside of some of the furbearers. There are indeed some possibilities of enhancement of many of the wildlife species with agricultural development.

When you clear the land, you create a beginning succession of development back to climax and you increase the numbers of such critters as the moose and some of the furbearers and these, of course, are key subsistence resources. One of the other areas of concern here, although it is not significant at the present, but has been in the past, is reindeer herding in the area. Most of the area particularly out in the western part of the delta lends itself to winter reindeer grazing. It does not lend itself well to summer reindeer grazing, because of the very high-water content, as we pointed out earlier.

Here again I think is one of those concepts that we may want to explore when we're talking about some resource uses: That is the temporal nature of some of these uses—the fact that reindeer aren't there when the waterfowl are; the fact that reindeer might be able to utilize this area when the waterfowl are not there, for example. These are some of the concepts that I think we will want to address later.

Mr. QUARLES. Before we start, I wonder if the next speaker would comment on not only the agricultural potential, but what percentile it is in your own resource assessment, if you would?

Mr. HANSEN. Yes, sir, I will. In the State of Alaska, as Mr. Epps has referred to, there are only about 18½ million acres that we have identified that have agricultural potential at all. So we tend to put value on any acreage that has some potential, just as an overview remark. The Yukon Delta area, however, does not come out rated high on a statewide basis for agricultural potential, though it does have some of these soils. No areas in it are rated in the top 50 percent of the State's agriculture. In the total area, there are 570,000 acres or about one-half million acres that have some agricultural potential. Of that 570,000 acres, about 500,000 are rated in the bottom 10 percent for the entire State for agricultural potential. Ninety thousand are rated in the sixth and seventh level percentiles for agricultural potential. So as an overview, from a statewide basis, according to our resource inventory assessment, this area has one-half million acres of agricultural potential, but it's in the bottom 10 percentiles.

Mr. QUARLES. When you refer to agricultural potential, are you referring to livestock potential as well as cropping potential?

Mr. HANSEN. This is looked at as a farming potential, so it's primarily looking at cultivation of crops and domesticated livestock. Your reindeer herding would be separate, a separate consideration.

Mr. REFFALT. Dave, could you also indicate what proportion of that potential agricultural soils will fall into private landholdings in that area?

Mr. HANSEN. Just one second and I can. We estimate that the Natives have currently selected nearly 490,000 of the 570,000 acres that have agricultural potential. We estimate that at least 300,000 of those 500,000 acres they've selected, they will retain, so we have low potential agricultural land and 300,000 to 500,000 will be probably retained by the Natives. Thank you. Just a point of information. Were we hitting forest potentials?

Mr. QUARLES. Yes. Did you have someone who wished to speak to forest potentials?

Mr. GRAHAM. Are you talking about, now, the Yukon/Kuskokwim Delta——

Mr. QUARLES. That's right.

Mr. HANSEN. OK. Well, I'll just make one comment, that on a statewide basis, there is nothing in the top 40 percent of the forest potential of the State that's in this area and total acreage along the river valley, there are only about 1.2 million acres of forestery potential, and in the State, we have identified 110 million acres of forest potential, so it's not a real important factor in this area. I'll address the State lands issue next.

Mr. TILESTON. Jules Tileston, BLM. On the forestry impact, you're dealing on the north side of the Yukon River with a very low incidence of fire control. However, in dry years, and you also saw the Seward Peninsula, it is not something that can be completely divorced and you've heard about operating ecosystems, so this is a factor that you need to consider. The south side of the Yukon River, particular as you move into the upland areas, does being to get into high fire-prone areas. At this point in time, it is probably 98 percent natural lightning. As people being to move into the area, though, that incidence is going to change and it's just fire-fighting in relationship to the resources and particularly the small "w" wilderness is an issue and in terms of habitat management, is an issue.

State and Native Land Selections

Mr. QUARLES. The next topic is State and Native land selections.

Mr. HANSEN. Mr. Chairman, Dave Hansen, Department of Natural Resources. Speaking to the State lands conflicts in the Yukon Delta area, there are very few. In the total Yukon Delta area, we're talking about approximately 16 million acres. In this area, the State currently owns or has selected 164,000 acres. We have interests in 91,000 acres. Our interest areas, and I'd have to look to see how the Yukon Delta, as defined in this area, are primarily here along the Yukon River and along the Koskokwim River and along Bethel. So we have very few interest areas or State land conflicts in the area.

Mr. QUARLES. Thank you.

Mr. HANSEN. May I make one more comment on land selection conflicts? You also had mentioned Native conflicts.

Mr. QUARLES. Yes.

Mr. HANSEN. For the record, of the 16 million acres in the area, the Natives have selected nearly 10 million acres. It is estimated that they will retain, after they have reduced their selection, 4.6 million acres of the earth. Most of this is along the river.

Mr. QUARLES. Along the river. Anyone else who wishes to speak to the land selection issue?

Mr. TILESTON. Jules Tileston, BLM. Another issue which needs to be considered is how much land is going to be left. As Dick Stenmark described earlier, we've dealing with an area which is 50 percent water. The Statehood Act conveyed to the State, legislatively, all title and ownership to navigable waters. The Yukon is clearly navigable and is covered by international treaties. The Kuskokwim in this part is also. A major issue for which no one has an answer is, what about all of the inland ponds and this sort of thing? But to the extent that those lands are subsequently determined navigable, it changes your land base pattern significantly in this area and you could end up with little Federal ownership left. We don't know at this point. But the water is an extremely important issue.

Energy Resources

Mr. Quarles. Let us go on to energy resources, which would include oil and gas, uranium, coal, geothermal, hydroelectric.

Mr. Morgridge. I'm Dean Morgridge, representing Alaska Oil and Gas Association, and on this map, map 10 which has been referred to here as the Yukon/Kuskokwim Delta area, there are three areas that are of interest and value to the Alaskan oil industry. The first of these is the Yukon Delta, itself, the modern delta of the Yukon River. The second area is the Koyukuk Basin, which extends a considerable distance to the northeast off this map, most of the Basin area is covered on map 7. Within map 10, we just have the southwest toe of the Koyukuk Basin. It extends down just a little ways beyond the bend in the Yukon River, just before it reaches this modern delta. The third area occupies the southern part of the Yukon/Kuskokwim Delta region. Within the industry, it's referred to as the Bethel Basin—Bethel being inside the basin area. It occupies about the southern half of the Yukon/Kuskokwim Delta area, although the exact basin outlines are pretty indistinct, due to the very limited amount of exploration that has been done in this area. It roughly has an area here on this map 10, of somewhere around 15 million acres. So it is a very large, relatively unexplored sedimentary basin.

Most of the information that I can discuss here is in the public record. We are a competitive industry. We can supply you with any of the information that the committee desires, which I'm going to mention. Most of it comes from the work done by the U.S. Geological Survey.

I want to talk about the Bethel Basin first. It is the largest of the three sedimentary areas here on this map 10. The Bethel Basin is covered by very recent sediment, sands and gravels. Much of it is deposits put down by the Kuskokwim River and its major tributaries. The basin is fairly well defined on the southeast by metamorphic and volcanic rocks, largely of Paleozoic and Cretaceous or Mesozoic age. The basin extends to the northeast—roughly as far as the present channel of the Yukon River. The northwest boundary is very indistinct. It is based primarily on aeromagnetic data, very sparse aeromagnetic surveys that suggest the possibility of a basement high running roughly, oh, from Marshall on down to just north of Nelson Island, somewhere in that area. That area also, the northwest flank of the Bethel Basin, is coincident with Cenozoic volcanics that extend down there and also a major fault trace that has been mapped years ago by the Geological Survey. The basin area, itself, is believed to be underlain by significant sections of sedimentary rock of largely Cretaceous age. We know this section is—at least in one area—in excess of 15,000 feet.

These are, by and large, shallow waters, shallow marine shoreline type sediments that are of interest to the petroleum geologist. There has been one well drilled in the Bethel Basin that was drilled in 1961 and 1962. If you want to plot it on this map, it's in section 34, 7 north, 78 west. It was drilled to a depth of almost 15,000 feet without success. However, there were rocks penetrated by this well that are of interest to the petroleum geologist. There's also the possibility that within this Bethel Basin area, 15 million acres area or 4-mile area, that there might be younger rocks of Tertiary age, that are present here. There's also the possibility that there are—there is a section beneath the Cretaceous that very well could have some petroleum potential.

In general this is a major sedimentary basin that simply has not received any extensive amount of exploration and we really can't give you a definitive assessment of the petroleum potential based on this single well that has been drilled in the basin or the very limited amount of either aeromagnetics, gravity or seismic data that is available within the basin area.

The second area I want to discuss is the Koyukuk Basin area, which is located in the northern part of the Yukon/Kuskokwim Delta area. This basin is defined fairly well on the southeast and northwest by volcanic rocks, metamorphic rocks, largely of Cretaceous age, and its southwest extension is somewhat indefinite, based on the limited aeromagnetics that are available.

It appears to extend some small distance beyond the Yukon River. Within the basin area, itself, there are Cretaceous rocks at the surface, and as I said, this is a basin that covers some 6½ million acres of which just a small portion extends into the area shown here on map 10. These are Lower Cretaceous and Cretaceous rocks, sedimentary rocks, and I can assure you, within the Koyukuk Basin area, there are rocks that are of interest and value from the petroleum standpoint. The part of the basin that extends into this map 10 has several mapped anticlinal structures within it that provide potential traps for hydrocarbons. There has only been one well drilled within this basin. It's located up near Nulato, some hundred miles north of the top edge, north edge of map 10, which has been some 12,000 feet without any success.

Now, the third area I want to mention is the present modern delta of the Yukon River. This has been within the Clarence Rhode National Wildlife Range for some considerable time and there is very limited information that's available there. Of course, it's covered by very recent sediments, but there is the possibility of Tertiary age sediments that are present further to the west out in the Norton Sound, extending beneath this Yukon River Delta area. Thank you.

Mr. QUARLES. Go ahead, Dave.

Mr. HANSEN. Yes. Looking at this area from a statewide context, it generally does not have lands that have been assessed in the top 20 percent of the State's oil and gas lands. However, it does have, as I mentioned, 14 million acres that have been identified as having some type of basin potential. The vast majority of that acreage, around 12.5 million acres of that acreage, is assessed in the bottom half of the State's oil and gas potential. Two things should be emphasized. One is that, as was mentioned, the area has not been explored much to date and, two, the State's assessment generally puts a tremendous amount of emphasis on probably well over 90 percent of the oil and gas upland potential, being contained within what we rank as the top 40 percent of the oil and gas potential of the State. So with that cutoff, this area contains 1.1 million acres that would fall within that top 40 percent. I might also mention as a——

Mr. SILVER. Where would those be located?

Mr. HANSEN. Those would be located, if you'll look on the map, the left—the pink on the northwest and the west, right there, and then up to the northwest, that's oil and gas potential, rated in the fourth 10 percentile for oil and gas potential in the State. Most of that land, about 52 percent, has been selected by the Native Corporation. We expect them to keep 29 percent. I might also point out that over 90 percent of the State lands in the area have oil and gas potential. So many of the past selections have already covered those areas.

Mr. HARVEY. Dave, for the record, when you refer to the Natives have selected such and such a percentage and are expecting to keep such and such a percentage, you're referring to the fact they've overselected.

Mr. HANSEN. Yes.

Mr. HARVEY. You're not talking about them disposing of lands, you're talking about what lands will ultimately be conveyed to them?

Mr. HANSEN. Yes, that's correct. Thank you.

Mr. OVENSHINE. Mr. Chairman, I'm Tom Ovenshine with the Geological Survey. Mr. Morgridge has already very adequately summarized what fragmentary geologic information there is in the delta area. Let me just note that in connection with our level II resource assessment of mainland Alaska, we've had a new look at the geophysics that pertains to the petroleum potential of this area and are providing to you today a map which I have here, which shows the areas Mr. Morgridge was discussing, the areas that must still be considered of interest for petroleum and natural gas. Thank you.

Mr. QUARLES. All right. Chuck.

Mr. HAWLEY. Mr. Chairman, Chuck Hawley, with the Alaska Miner's Association. Some of the areas discussed do have uranium potential, uranium occurrences. Specific places that are in or close to (d)(2) areas with uranium potential would include the area between the Kasna and Holitna Rivers. That's on the south side of the Yukon. On the north side of the Yukon, the Nulitna River and the Upper Dulbi River, which would be a tributary into the Koyukuk Basin. Within the Yukon/Kuskokwim National Forest, the uranium occurrence in the Nixon Fork Mining District and also uranium occurrence near the upper end of the Kuskokwim withdrawal from the Russian Mountains. In general, the Yukon/Kuskokwim Mountains lie or include a northeast area of granitic and volcanic—granitic and acidic volcanic rock which do tend to be enriched in uranium and are therefore a more likely host, but the status of geological knowledge for this whole area is very minimal, so that only a few occurrences have been noted to date. Thank you.

Mr. HANSEN. Mr. Chairman, I'm Dave Hansen, Department of Natural Resources. I might just mention that we come up with, in the total State, around 105 million acres that have some uranium potential. This area does include having some potential, 12 million acres. Due partially to the lack of knowledge, all 12 million acres are rated on a scale of one to five, as number five.

Mr. HARVEY. Five is low?

Mr. HANSEN. Five is low, correct. But I must emphasize that there has not been a great deal of exploration, which Mr. Hawley pointed out.

Mr. BARKER. Mr. Chairman, my name is Jim Barker, with the Bureau of Mines. For the record, I'd like to mention that we have recently put out and hereby present this committee with a set of 19 maps on a scale of 1 to a million or level 2 that show the areas of potential for oil and gas and uranium, coal, geothermal energy and hard rock minerals. As far as oil and gas goes, we recognize a moderate potential, based on the geologic information available in the delta area. We also feel that there is a moderate, but generally unassessed potential for sedimentary uranium. Hard rock uranium, that's uranium associated with granitic rock was well summarized by Mr. Hawley. I might add that there is a potential for geothermal energy just north or northeast of Bethel. Finally, coal does occur on Nunivak Island and in the Nelson Lagoon area.

Mr. QUARLES. Anyone else that would like to comment on this area?

Mr. MORGRIDGE. While we don't have any quarrel at all with the State assessment in our mineral resources, and I'm referring here to oil and gas, on priority areas, I do want to emphasize that in the areas that we're discussing here at this time, the amount of exploration data that is available is so scant that in my opinion any numerical assessment is pretty mean.

Mr. SILVER. Could somebody, for the record, tell me the areas that Chuck mentioned, Kasna, Holitna, Nowitna and the Yukon/Kuskokwim Mountains, are those (d)(2), (d)(1) withdrawals or a combination of the two?

Mr. HERBERT. No, they're all in (d)(1) withdrawals at present.

Mr. SILVER. And they're all in (d)(1) withdrawals?

Mr. HERBERT. Yes.

Mr. QUARLES. If we could——

Mr. HERBERT. No, no, I beg your pardon. I think the Kuskokwim National Forest covers that Kasna Holitna area, doesn't it?

Mr. HANSEN. That's right.

Mr. SILVER. Thank you.

Nonfuel Mineral Resources

Mr. QUARLES. If we could, then, move on to nonfuel mineral resources, the next to the last topic for this area. Chuck.

Mr. HERBERT. OK. I'm Chuck Herbert with the Alaska Miners' Association. The area has a broad belt where mineralization has been known and established mines have been operating for a great many years. The belt is some 40 or 50 miles wide and it runs all the way from Goodnews Bay. The only strictly platinum mine that was ever operated in North America and it runs through the most important—some of the most important placer mining districts. Prospecting in that area has generally been for gold and while there are a great many places where gold has been recognized, it is also well known as a mercury-producing area of very considerable extent, extending from the Kuskokwim on the southwest, all the way to the Dillingham area, from the Sleetmute on the Kuskokwim.

It, in time, has produced quite a lot of quicksilver, so it is important in that way. For other metals, the area has not been known in the past, but I would point out that some of the work that has been done that is not published and does not show on this map of frequency of mineral occurrences, does include what we consider to be one of the very important zinc/lead districts in North America. That is, it has a good possibility of developing into that and yet its existence was completely unknown until a few years ago, when a group of companies began to prospect on the Doyon lands. It is now on the Doyon lands, and I think it's an important asset to the native corporation. It does point up the fact that dependence upon published information is not going to be a safeguard against blocking up something that can be extremely important. I think that Chuck has, of course, covered the uranium and we do consider that this broad belt through there has very, very high potential for base metal and gold, of course.

Mr. BARKER. Mr. Chairman, Jim Barker with the Bureau of Mines. We'd like to point out that in addition to hard rock uranium, the area does have a favorable geologic setting for tin and tungsten mineralization. The northern part of the delta area appears at this time to have a low potential for base metals. There is no information available to make a more accurate assessment. I would also like to state that the maps we are providing the committee includes a set of colored overlays at one to a million scale, showing mineral potential, historic mining areas and metallogenic provinces.

Mr. QUARLES. Just one thing, while we're here right now. I would caution everyone, this is the printed record for the members, so whenever possible for us, it's nice to point out an area by the color on the maps, but if you could also use the geographical name, it will help our people when the read the record. Is there anyone else that would like to comment or respond?

Mr. HAWLEY. I'd like to repeat that I put that north fork of the Kuskokwim in the top ten percentile of anybody's figures.

Mr. TILESTON. Jules Tileston, BLM. There was one mineral resource which has not been mentioned and, based on a statewide rating, it is important. That's gravel. You're dealing with fifty Villages located on flood plains, very high silt content. Any development, mineral, housing or anything else, public or otherwise, is dependent upon gravel in this area. The north side of the Yukon River is again, basically, bedrock, unglaciated or very relatively minor glaciation, if any. The south half, particularly the Kisaralik, is glaciated and a good percentage of the mantle overlying bedrock in that area is relatively good gravel. It is adjacent to Bethel, it is adjacent to river transportation. It is we think, in BLM's judgment, probably one of the top areas and certainly the top area in this area, where gravel is an important resource which affects everything, and that includes Native development, OCS, mineral development and right on down the line.

Mr. HANSEN. Mr. Chairman, I might make one clarifying remark and perhaps ask Mr. Herbert a question. If I'm not mistaken, the area you were identifying does not fall within the Yukon Delta area specifically?

Mr. HERBERT. You're correct. I perhaps am misunderstanding the scope of this. I thought we were discussing the entire map area.

Mr. QUARLES. No, we're going to discuss other areas subsequently this morning. I didn't interrupt you simply because I thought we could get some information on the record. That's fine.

Mr. HANSEN. OK. So my assessment that I was talking about does not include the area you're referring to? Thank you.

Transportation and Access

Mr. UMLOFF. I'm John Umloff. I'm the director, transportation planning, for the Alaska Department of Transportation. First off, I'd like to say that my colleagues and I are heartened by the fact that the natural resources planners and the natural resources people do give recognition to transportation, for without the transportation access, the acquisition of these resources wouldn't be a reality. You couldn't enjoy the wild and scenic views. You couldn't enjoy the fish without the transportation, be it a trail, be it a stream, whatever it might be. The transportation existing in this particular area is rather rudimentary. The primary access during the summer months is by barge up the waterways, which are used to transport mainly freight and fuel up into these areas. So the Kuskokwim and the Yukon Waterways are very essential to the survival, the survival of the area and growth of the area.

There are no major surface links, in fact, no surface links to the major transportation corridors that progress from the south end of the State, Seward, Valdez area, all the way up to the now Arctic Ocean. So we have no access into that area by surface. There are some fragmented road systems, very minor road systems, usually centralized around some of the city areas, like Bethel, but again there's no what we consider to be a surface transportation system in that particular area. The main access by the frequent user is by air. So airports are a very essential element for travel in that area. We feel that corridors or access should be considered as a resource and provisions made for it when we are considering any type of expansion or utilization of the land or resources in the area. But again transportation in that area is very rudimentary and the principal conveyance is by air for people and small loads of cargo. The freight movements are, during the summer months, most frequent by the riverways.

Mr. HANSEN. Mr. Chairman, Dave Hansen, Natural Resources. I might just add a comment to that. In identifying potential corridors in the area for the future, we find that around 75 percent of the townships that could potentially fall in them are selected by the native corporation, just as point of information.

Mr. UMLOFF. We have on occasion identified three principle corridors in the area, one which we call the Kuskokwim access corridor, which takes off from our north-south corridor in the area south of Fairbanks and progresses down as far as the Kuskokwim River. We also have a spur that joins the Ruby to Willow area and we also have a west coast access corridor which would bring us from the Shelikof Strait tidewater, all the way up to the Kotzebue area, and we feel that those are basic to the access or egress into that particular area.

Mr. SHANE. Can I ask a question?

Mr. QUARLES. Certainly.

Mr. SHANE. Ben Shane, with the Alaska Coalition. Are you referring to a corridor system that has been developed by the Department of Transportation?

Mr. UMLOFF. There has been no corridor system, per se, developed by the Transportation Department.

Mr. SHANE. Could you explain, please, the status and meaning of the corridors that you're describing?

Mr. UMLOFF. These are proposed. I think we're getting the concrete syndrome mixed up here. There are no intentions on the part of the department to build or to construct or to make these corridors a reality.

Mr. HANSEN. Dave Hansen, Natural Resources. A further clarification would just be that, when we're doing overall assessments, looking 50 to 100 years into the future, we are looking at natural features and just identifying if something were to develop, these are potential areas where they might develop.

Mr. UMLOFF. Yes.

Mr. HANSEN. So this doesn't come from any official proposals at all?

Mr. SHANE. In the proposals, these corridors have no necessary relationship with identified natural resources or specific transportations needs that you have identified. They're purely natural features on the land, and I understand?

Mr. UMLOFF. Yes, and we feel that natural features should be considered as a resource as far as transportation systems.

Mr. TILESTON. There is one other transportation issue which has been talked about from time to time and that's a canal linking the Yukon and Kuskokwim Rivers. To my knowledge, that is receiving absolutely no credibility and I think the last time the corps looked at it 2 years ago, and you should address that to the corps, the feasibility was not there, but it is something that crops up and as far as we know, it's dead. I would defer to the State on that, though. Are you aware of anything going on? It just is something that pops and that gets it out of the way?

INNOKO-KAIYUH AREAS

Scenic, Landscape, Historic, and Archeological Values

Mr. QUARLES. Fine. I'd like to move onto the Innoko-Kaiyuh areas. We hope to complete this region and get to southeastern this afternoon, so I would hope that each person would highlight his statement as much as possible, recognizing already that people have tried to highlight as much as they can. I also note that some of these areas have already been covered, and if they have been, please do not cover them again. If we could, then, start with scenic, landscape, historical, and archeological values.

Mr. REFFALT. The scenic values of the Innoko basin and the Kaiyuh basin would be, although not coastline and not quite as totally flat, would be quite similar to what we've just talked about on the Yukon delta. These are areas that are again very low, with a great deal of water. The rivers in the area are slow and therefore meander a great deal. There are low hills between the Yukon River and the Innoko basin, itself, and additional low hills on the eastern portion of the Innoko. As with the Yukon delta, I think in areas of such large flat terrain, you have a scenic sensitivity, if you will, in that it is very easy to mar this sometimes monotonous landscape with other intrusions, and that would be true of both the Yukon delta and the Innoko basin. Other than that, in the Innoko, you're getting into an area where more trees come into play. Because of the additional physiographic features, you don't have quite the monotony that you find from the scenic standpoint on the Yukon delta, itself.

Mr. QUARLES. Yes?

Mr. WELCH. Bill Welch, Heritage Conservation and Recreation Service. I believe you made a call for scenery, history and archeology at this time. Under history, we would just note that the Iditarod trail does go through the heart of Innoko and if we could just note on the record that that is a very important historic value.

Wildlife and Fish Resources and Uses

Mr. QUARLES. OK. Then I'd like to move onto the wildlife resources. Again, identify first the variety of wildlife and habitat potential and then afterwards we'll go on to use patterns.

Mr. HANSEN. OK. Dave Hansen, Department of Natural Resources. In summary, from a statewide perspective, the Innoko area is again a very high value wildlife area. It has over three million acres in the area and all of that three million acres falls in the top half of the State for wildlife habitat. A good part of it is in the fourth and fifth ten percentile, but generally it's also noted as good wildlife area. Thank you.

Mr. QUARLES. Anyone else who wishes to speak to the wildlife at this point?

Mr. REGNART. Mr. Chairman, Ron Regnart from Fish and Game. I'll speak about the fishery resources very briefly. There are three species of salmon that use the Innoko River drainage for rearing and spawning, King, coho and chum salmon. There are whitefish, pike, sheefish, burbot and grayling. There is a very small subsistence fishery. Although the majority of the salmon subsistence needs have been traditionally obtained from the residents of this drainage from the main Yukon River, the Dishna River is a spawning stream, with a few thousand chum salmon and a few kings. The Iditarod, those surveys are incomplete, we have reports of salmon spawning, but we have not been able to document them. That completes the fishery resources at this time. I think other members of our department have information on the game.

Mr. SHEPPARD. Mr. Chairman, my name is Pete Sheppard, Game Biologist for the Fish and Game Department. The Innoko drainage supports a very high population of moose. It's been estimated there are about 3,000 moose in the area. In addition, it's an important black bear area. Black bear are quite abundant in the area. There are a few grizzlies. In addition to the waterfowl, which perhaps the fish and wildlife people will mention, there is a large population of mink, otter, muskrat and other furbearers. The beaver population is very dense and supports a considerable amount of commerical trapping, and a few scattered caribou in the area. There are some dense populations of snowshoe hare, ruffed grouse and spruce grouse. I believe that's all I have.

Mr. BARTONEK. Mr. Chairman, James Bartonek, Fish and Wildlife Service. The Innoko lowlands and the Kaiyuh lowlands are characteristic of many interior Alaskan warm solar basins that are extremely productive as far as waterfowl go. There are flood plains that gain much of their wildlife value because of the enrichment they periodically get through their flooding. While at times it may be destructive of a particular group of wildlife in a specific locality, the long-term benefits are far greater than the losses. The Innoko and the Kaiyuh areas produce an estimated fall flight of 380,000 ducks, about 65,000 geese and several thousand cranes and uncounted numbers of shore birds of many species.

Again, the local importance of the waterfowl species, to people within the region and the state are perhaps, numerically, not as great, although to them of very much importance, but the resource is of greater concern to the people throughout the 48 States—the lower 48. The map behind you shows the migration routes of some of the major species within the area. The green would be characteristic of birds such as the pintail, the red one would be representative of birds such as the white-fronted goose, which will migrate to the central flyway, winter down on the Texas Gulf Coast. You have birds such as the greater scaup which will winter along the east coast, some canvasback wintering along the East Coast, but a percentage of those will also come down through the Pacific flyway. The wetland complex, in addition to the waterfowl that nest there, obviously, would support a large number of fur bearing animals and that's all I have.

Mr. CLINE. Dave Cline, of Alaska Coalition. I migh just add that according to our figures, there are approximately 140 species of birds in the Innoko area, including, on occasion at least, but not known to nest, the endangered peregrine falcon, along with bald eagles, ospreys and, of course, a variety of water birds, including loons. I feel that the recreation potential here is extremely high. I think it's being demonstrated already with the spillover of urban hunters, particularly after moose in the very recent past indicates that in the future we're going to see increasing recreational pressures on the Innoko, particularly as Anchorage grows and as hunting opportunities become less attractive in formerly favored areas near the city.

Moose hunting, as I mentioned, is growing very rapidly along with fishing, I think with the Innoko River being so outstanding in terms of its canoeing and kayaking potential, that we're going to see a growing use of the river for boaters and it's worth mentioning again, I think, the fact that even though waterfowl hunting there at present by other than local residents around villages isn't that great, the exported waterfowl that migrates to other States provides at least, according to Fish and Wildlife Service estimates, 125,000 use days in the lower 48. Thank you.

Mr. QUARLES. Before we get off the subject, several people have mentioned the importance of the waterfowl to the lower 48 and also the importance of the area in general to recreation and sport hunting. Does anyone know whether this is a fairly intensive subsistence hunting region as well?

Mr. SHEPPARD. Mr. Chairman, yes, this is extensively used for subsistence hunting, for both moose and fox.

Renewable Resources

Mr. QUARLES. We'll move on to renewable resources. Once again, that's agriculture and timber. Dave.

Mr. HANSEN. Yes, Mr. Chairman. I'm Dave Hansen, Department of Natural Resources. The river valley lands in the Innoko area have some agricultural potential. As I mentioned before, there are 18 million acres statewide. In this particular area, 245,000 acres have been identified, so it is not a large acreage. Of that acreage, none of these lands fall within the top half of the State assessment for agricultural lands, so it isn't rated extremely high for agricultural value, but there is some there. From the forestry standpoint, again, we had, I believe it was 187 million acres rated statewide. This area has around 1.1 million acres, with some forestry potential. None of that potential was rated in the top 40 percent of the State's assessment. The majority of it is rated in the seventh, eighth, ninth, and tenth percentiles, so there is some forestry potential there, but it is relatively low on a statewide basis.

Mr. GRAHAM. Mr. Chairman, Hatch Graham with the Forest Service. We'd like to cover the timber potential of the entire Western region at one time, if we can, because it's rather interlinked. So if we could postpone our presentation till a little later?

State and Native Land Selections

Mr. QUARLES. Fine. We could move on to the State and Native land selection question. I assume you'll be handling that, Dave, as well?

Mr. HANSEN. Yes. Mr. Chairman, the State currently owns 53,000 acres in the Innoko Refuge area. We have interest in 138,000 acres, all of it is primarily for river frontage along the Yukon River and also for some of its land capability potentials. The Natives have selected 288,000 acres and are expected to retain, after their overselections are reduced, 239,000 acres. We're using the base total of comparison of an area of 3.4 million acres, total area. Thank you.

Mr. SILVER. Dave, where are those located?

Mr. HANSEN. The portion of the refuge that borders the Yukon River are where all the Native and State selections are. Almost the entire length.

Mr. WILLIAMS. Mr. Chairman, Dave Williams, Doyon Limited. Dave's summary was pretty good, as far as our selections go in the area, and your guesstimates aren't bad either. One of the primary reasons we selected in what we call the Kaltag Withdrawal, which borders the Innoko to the west, was timber potential. It's not our major timber area, but it is a significant part of the Doyon timber resource, tying in with four villages which are to the south that are off this map, Grayling, Shageluk, Anvik, and Holy Cross, and then tying into the north with Kaltag, Nulato, Koyukuk, Galena, makes a relatively extensive land holding pattern of Doyon and village groups throughout this portion of the Yukon.

Our primary concern in this case and most cases is the off-site impact of the (d)(2) lands or as our friends across the table might call it the off-site impact of our activities on the (d)(2) lands. We have concern with various water quality problems, air quality problems that could occur if we go into production in these areas, and we are neighboring a wildlife refuge. We see these as the primary problems for Doyon. Of course, in the case of the timber resources, with the interlacing of the refuge and the Doyon selections in this area, we also see a potential loss of some supplies if we were to go into timber harvest in this area. I think a timber supply off of Federal lands to supplement any timber that we've got might be very essential in order to develop the industry in the area.

Energy Resources

Mr. QUARLES. Thank you. Let's move on to energy resources, oil, gas, uranium, coal, geothermal, hydroelectric. Anyone like to speak to that?

Mr. HANSEN. I might just give an overview summary. Of the 113 million acres noted for some oil and gas potential in the State, this area includes a half million or 500,000 acres, approximately. That 500,000 acres is not rated in the top 60 percent of the State's oil and gas potential and so it falls between the 7th, 8th, 9th, and 10th percentiles for oil and gas ratings. There is some coal potential noted in the region, but of a very low quality on a statewide comparative basis. It's about 6,000 acres and it falls in the bottom 10 percent for the State's coal potential. There are about 1.1 million acres identified for uranium potential. These all fall in the bottom level for uranium ratings, No. 5 on a statewide basis.

Mr. QUARLES. Chuck.

Mr. HAWLEY. Chuck Hawley, Alaska Miners Association. Our primary concern for the areas would be on transportation/access. Both the Innoko and the Iditarod have been used as access to historic and still active placer mining districts. Also the northern part of the Innoko region would have at least some potential for elements like chromium and platinum, based on the existence of automatrix and matrix rocks in that area. But the main access point upriver to the Innoko would be at the placer mining camps near Cripple and then as you come up there, why, the river was used and then there was a trail, a winter trail or an access point that was used for overland transport from just about the eastern edge of the Innoko withdrawal to the Cripple District, and then the Iditarod was the main access, historic access, for the town of Camp Creek, which is still active and the river is still used for riverboats and things like that.

Mr. BARKER. Mr. Chairman, Jim Barker of Bureau of Mines. We have found that the area immediately to the southeast of the Innoko region is highly favorable for mineralization and the withdrawal, as we've plotted it, infringes slightly onto this, some of the southeastern corner. Generally speaking, the eastern margin of the region may have some potential but there is very little information available to substantiate that at this point.

Mr. SILVER. When you say the withdrawal, do you mean the (d)(2) withdrawal by the Secretary?

Mr. BARKER. I believe they're fairly close with H.R. 39. We've plotted both versions and I believe the borders are just about the same.

Mr. SILVER. What difference is there between the S. 1500 proposed areas as compared to the withdrawals?

UNIDENTIFIED VOICE. I think the eastern boundary is about the same.

Mr. SILVER. Thank you.

Mr. MENZIE. Mr. Chairman, Dave Menzie, U.S. Geological Survey. From our level II study, open file 78–1D, which will be submitted as evidence, there is an overlay which shows the areas which we consider have some possibility for mineral resources.

Area 11 is a belt of geology which is considered permissive to the occurrence of maybe volcanogenic sulfide deposits and from our estimates elsewhere, about 90 percent of the deposits would have tonnages greater than 0.24 million tons, 50 percent would have tonnages greater than 2.3 million tons and 10 percent would have tonnages greater than 22 million tons.

The copper grades on such deposits: 90 percent would have copper grades greater than 1.1 percent, 50 percent would have copper grades greater than 2.2 percent, and 10 percent would have copper grades greater than 4.1 percent. There would also be zinc in such deposits. Ninety percent of the deposits would have greater than 0.3 percent zinc; 50 percent, greater than 1.3 percent zinc; and 10 percent, greater than 5.5 percent zinc.

In area 12, there is a potential for porphyry copper. There's some alteration known in the area of some pyrite zones. The porphyry copper deposits, we estimate that 90 percent such deposits would have greater than 20 million tons; 50 percent, greater than 100 million; and 10 percent, greater than 430 million tons. The copper grades of such deposits: 90 percent would be greater than 0.1 percent copper, 50 percent would be greater than 0.3 percent copper and 10 percent would be greater than 0.55 percent copper. There would be some molybdenum also with 50 percent of the deposits having greater than 0.008 percent molybdenum and 10 percent of the deposits having greater than 0.03 percent molybdenum.

Mr. HARVEY. Can you or perhaps the Bureau of Mines representative is better on this, and I'm sure the miners would have some comments, give us some judgment as to what those numbers mean in terms of commercial potential? You're discussing, it seems, resource potential. Bureau of Mines may be able to get into the reserve aspect of this and are we talking about a mineral that's developable economically, under today's conditions?

Mr. MENZIE. As far as the Geological Survey is concerned, this is just a belt of geology which is favorable for the occurrence of such deposits, and we did not consider the economics. We would have to defer to the Bureau of Mines.

Mr. BARKER. Mr. Chairman, with the information available on this region, we can suggest the type of deposits which may be present. We can say that in other areas of similar northern latitude, such deposits are mined. Whether the grade and tonnages of the deposits present in this area are high enough to warrant mining, only future work can tell.

Mr. MENZIE. There is one other type of area which occurs in this region and that would be area 14, which has gold placers known and polymetallic veins. It also has a potential for uranium and thorium disseminated in the igneous rock. There's also the possibility of tin granites and also then stratabound, possibly volcanogenic models, that the relevant grade and tonnage work that we've developed on this would be for. The tungsten deposits, these would be tungsten/tactite deposits and the tonnages of the tactite deposits would be 0.024. Ninety percent would have greater than 0.024 million tons, 50 percent would be greater than 0.63 million metric tons, and 10 percent would be greater than 17 million metric tons. The tungsten grades, 90 percent of the deposits would have greater than 0.24 percent W, 50 percent would have greater than 0.51 percent W, and 10 percent would have greater than 1.1 percent W.

Mr. HARVEY. Could you submit, for the record, just a statement as to why you pick those particular classifications of percentages, I'm assuming some of these would be regarded as very high grade ore bodies of nonhigh grade or what-have-you.

Mr. MENZIE. These figures are contained in the open file report and also a discussion of the reason these—largely, these were selected from deposits worldwide, which were felt to be similar. There's one other thing. There is, south of the area, the mercury belt, which is belt No. 4. This is not within the (d)(2) withdrawal, as we have seen it, but this does contain mercury deposits and here we've attempted to make an estimate of the number of deposits which would occur within area 4 and our estimate is that there's a 90 percent chance that the area contains 30 or more deposits, a 50 percent chance that it contains 70 or more deposits, and a 10 percent chance that it contains 110 deposits. The sizes of such deposits are in terms of contained metal, rather than in terms of grades and tonnages because of the nature of mercury deposits, and we estimate that in terms of the contained mercury content, 90 percent of the deposits would be greater than .09 tons, 50 percent of the deposits would be greater than 3.1 tons, and 10 percent of the deposits would be greater than 120 tons. Thank you.

Mr. QUARLES. Chuck.

Mr. HAWLEY. Yes. Chuck Hawley. On the basis of the records of the deposit types that are commercially exploitable are the placer gold deposits and to some extent, the high grade types of deposits and the level of knowledge just isn't to the extent that you can go beyond that and speculate. Because it's fairly far out, why, the types of things that people would be looking for would be high grade types of deposits, deposits of high grade, valuable commodities like tin and tungsten.

Mr. HANSEN. I'd state that on a statewide basis, of the 187 million acres identified with mineral potential, this area includes a little less than a million, about 75 percent or about 750,000 acres of that is assessed to be in the bottom half of the State mineral potential. There are identified about 22,000 acres that do fall within the second 10 percentile.

Mr. QUARLES. Where would those be?

Mr. HANSEN. I'm going to have to unroll a map to show you. We'll be unrolling it for the——

Mr. QUARLES. Are those in a (d)(2) lands withdrawal?

Mr. HANSEN. They are—this is within the Andrus proposal withdrawal area. The 22,000 acres.

Mr. BEVINETTO. Dave? I guess for the record it would be helpful to make a general statement about how the criteria for the potential were developed and what is measured.

Mr. HANSEN. OK. We have and will submit for the record, a detailed description of how we went through the entire process over the last two and half years of putting together a State inventory and assessment of the various resources we discussed. And it has been quite a thorough process, but I will say for now that we have gone through two reassessments and are in the midst of our third reassessment, continually trying to update the information and get the best expertise at all possible.

Mr. QUARLES. I think the one thing that would be worthwhile to note is whether potential is based simply on the quality of the ore body, itself, or do you include the economics, the accessibility question?

Mr. HANSEN. This is based upon primarily the quality of the ore body, itself, but we also do include, as one of the factors, accessibility and what we call developability or the odds on it being developed.

Mr. QUARLES. I think we would like, too, if any other organization or individual here has comments on the criteria that the State has been using, we would like to have those for the record also. If you think they're good, that would be good to know. If you disagree with them in some manner, we'd be interested in kowing about that, too.

Mr. HANSEN. For the record, we also welcome those, too.

Mr. CLINE. Mr. Chairman, Dave Cline, Alaska Coalition. Just as a point of clarification, I was having a little trouble following the Survey's location of the potential mineral deposits. Are they, in fact, on the valley floor or in the vicinity of the (d)(2) or within the (d)(2) withdrawal or in the highlands to the east, primarily the area of State selection?

Mr. MENZIE. Some of the area within the (d)(2) would be permissive for the occurrence of these deposit types.

Mr. HARVEY. When you say it would be considered permissive for the occurrence of those deposits, I don't understand. I'd like to know.

Mr. MENZIE. OK. What we're saying is that the area is essentially geologically unknown, but the rock types that are there and some of the other indicators are similar to areas which contain deposits, so these can be examined on our overlay which is up there, just to see exactly which pieces of land are within the (d)(2) withdrawal. To go over them individually would be difficult, because of the nature of the geology, but they have been outlined on the basis of geology, so much of the area which would be quaternary, would not be affected by the—as far as our work goes.

Mr. SILVER. This area has gone through level II, is that correct,

Mr. MENZIE. This is all level II resource appraisal, yes.

Mr. SILVER. OK. And where are you in regard to level III work?

Mr. **Menzie**. I don't believe any level III work has been completed in this area at this time. As far as the scheduling of it, I would have to defer that.

Mr. **Silver**. That's OK. I just wondered if you could—am I correct that on certain areas, you have gone into level III?

Mr. **Menzie**. In a few areas, but this is——

Mr. **Silver**. When you reach those areas that you have done level III, could you tell us, so we'll know?

Mr. **Menzie**. Yes, I will.

Mr. **Reffalt**. Bill Reffalt, with Fish and Wildlife. All your percentiles that you were proposing on tonnages and occurences and so forth, were those statistical probability levels or were those actual percentages that you've calculated of ore bodies?

Mr. **Menzie**. Those probabilities are based on an analysis of deposits which we would consider to be similar to those which might occur in this area, so the probabilities are a result of an analysis of the data.

Mr. **Reffalt**. They're statistical probabilities?

Mr. **Menzie**. Yes, they are.

Transportation and Access

Mr. **Quarles**. If we could, the last values to be discussed in this area are the transportation values. I know that Chuck Hawley has already discussed in part the access question. Does anyone else wish to discuss the transportation or access question? No? In that case, we go to the final area for this morning, the Nowitna area. Once again, we start off with scenic, landscape, historical, and archeological values.

Mr. **Gordon**. Richard Gordon, Alaska Coalition. I have two scenic areas to comment on. One, the Nowitna River, in addition to the recreational and quality upstream values, has primarily a gentle to moderately rolling upland and is, probably more so than the average river in the interior, a river that has a great deal of diversity of river edge land forms, including one rather deep canyon, which is immediately south of the southern boundary of the proposed Nowitna Refuge, but within the proposed wild river corridor.

The other area I want to call your attention to, and I would suggest consideration, at least, of possibly adding it to the refuge, if there's no conflict. There are about a half a dozen townships or so, immediately to the east of the central portion going from north to south, central boundaries of the Nowitna Refuge. As near as I can determine, these are BLM lands that have not been selected. Within that small area, the area of Boney Creek, Little Mud Creek, there is silt covering a poorly consolidated bedrock uplands, flat to gently rolling uplands, which is very heavily and very thoroughly and intensely dissected by Boney Creek and Little Mud Creek and their tributaries. There are dozens—several dozen little canyons, 250 to 300 feet deep, cut into this poorly consolidated material. It's a type of topography which, to the best of my studies, appears only in one other place in Alaska. So from a landscape and visual point of view, it is a striking type of, if you will, canyonlands topography which is perhaps worth noting by the committee. Thank you.

Mr. QUARLES. Would you point out on the map where that is, that area that you just discussed?

Mr. GORDON. That's on the scenic map back here. The black line here is the administration's Nowitna proposal. This red circle right there is the Boney Creek/Little Mud Creek canyonlands area I'm talking about.

Mr. QUARLES. On the eastern side, then, up to the north?

Mr. GORDON. Yes. At the northern edge of it, there are some State or some native selections, but most of it appears to be barren land.

Mr. QUARLES. Thank you. Anyone else wish to—yes, please?

Mr. WELCH. I would just say that the landscape and the scenery which has just been described by the Alaska Coalition, together with the wildlife that probably will be described shortly here, the source of agates on gravel bars along here would qualify the Nowitna River as a wild river.

Mr. BARTONEK. James Bartonek, Fish and Wildlife Service. The Nowitna area, of course, is characterized by the river and the river has moved from two rather steep mountains and the scenic aspect of the river, itself, there is as fine as any river system in that portion. And then as it changes its aspect, as it enters out into the flood plain toward the Yukon River, it becomes very meandered and has low forest aspect. Perhaps the Yukon River itself and the fact that the Nowitna area does border, essentially, on the south side of the Yukon River, or the Yukon River with the steep cut banks are rather spectacular. I'd like to have Curt Wilson address the historical and archeological aspects.

Mr. WILSON. Right now, I can't really be too specific, because there's been very little work done in that area, but generally I would be willing to make an educated guess that the area certainly has been occupied for several thousand years and potentially may provide information which would be useful in some of the "early man studies" that are going on in Alaska.

Wildlife and Fish Resources and Uses

Mr. QUARLES. The next value to be discussed is wildlife, again beginning with the species and the habitat and then going on with use patterns.

Mr. BARTONEK. James Bartonek, Fish and Wildlife Service. Again, the Nowitna is characteristic of one of the interior solar basins which, much like the Innoko-Kaiyuh area, produces some of the same kinds of waterfowl. In essence, probably the same proportion. But because the area is smaller, numerically the fall flight from the region is also smaller. There's estimated 35,000 white-fronted geese which migrate again through the Central Flyway, principally down to the Texas gulf coast, and estimated 17,000 lesser Canada geese that will migrate down to the Pacific Flyway and they'll winter principally in Washington, Oregon, and California. There are a few trumpeter swans, possibly as many as 50 pair nesting within the region. This represents almost the westernmost limits of trumpeter swans along the Yukon River. There are some up in the Koyukuk Basin which will be discussed later. The north side of the Yukon River, within the proposed boundary, contains historic nesting sites for peregrine falcon Altogether, the Nowitna perhaps contributes about a quarter million waterfowl that migrate again principally down the Pacific Flyway, but also contribute to the other three flyways, the Central, Mississippi, and the Atlantic. The region is important fisherywise and big game, moose. Thank you.

Mr. HANSEN. Dave Hansen, Department of Natural Resources. On a statewide basis, the 2 million acres in the Nowitna area fall in a more moderate category for overall wildlife habitat than, say, the Yukon Delta. Approximately 1.4 million of the 2 million acres is rated in the bottom half of the State's wildlife habitat area and looking at general habitats. Also, 28,000 acres are rated in the top 10 percent which are right along the river bottom of both the Yukon and the Nowitna Rivers.

Mr. QUARLES. Are those selected areas or likely to be selected?

Mr. HANSEN. 20,000 of that 28,000 has been identified by the State for selection. We have previously selected two and a half thousand, so the vast majority are a high interest area for State selection. The Natives have selected only approximately 2,000 acres.

Mr. QUARLES. When you made the presentation and brought down the maps of the 73 areas to be selected for possible selection to complete your State selection, you also ranked those areas, I believe.

Mr. HANSEN. That's correct.

Mr. QUARLES. When you mention, in the future, these areas identified for State selection, if you could also tell us whether they were high, medium, or low in your own critical list.

Mr. HANSEN. These are high.

Mr. QUARLES. All right.

Mr. ROGUSKI. Mr. Chairman, I'm Gene Roguski, Alaska Department of Fish and Game. I'd like to say a few words about the fisheries values in Nowitna and also, if I may, in the Upper Kuskokwim areas. First, as relates to the commercial and subsistence fisheries, the Nowitna area in the main Yukon River, principally from Ruby to Tanana has a small commercial and subsistence fishery combined of probably 5,000 to 10,000 salmon, mostly chum salmon. They also have small subsistence fisheries for whitefish and sheefish. In the Kuskokwim, the Upper Kuskokwim, from McGrath upstream, is principally a subsistence fishery of perhaps 2,000 salmon annually, also some whitefish and sheefish. This area also has in the headwaters of the Kuskokwim, some of the principal sheefish spawning areas on the Kuskokwim system.

As relates to sport fishing in the Nowitna River, per se, this is a very popular river, considering its remoteness from most population centers. I would estimate there are several hundred trips made to the river annually, fishing and hunting combined. I would say most people that go down there to hunt probably also go to fish. The main species caught are sheefish, where there is a local population of sheefish which spends winters and springs in the lower river or else in the Yukon and migrates several hundred miles upstream to spawn in the fall. Also the lower river is known for its large pike, and the entire river system has a good number of grayling in it. There are small subsistence fisheries on the river, itself, by locals living on the river.

Mr. SHEPPARD. Mr. Chairman. My name is Pete Sheppard, Alaska Department of Fish and Game. In talking about the game resource here, I will include both the Nowitna River drainage and the drainages included in the remainder of the forest proposals that are considered. As in some of these other areas in the interior, moose is by far the most important game species. The population at the Nowitna is approximately a thousand to fifteen hundred moose. There are good populations of black bear, some caribou. The use patterns are pretty extensive, both subsistence and sport hunting of moose, in the Nowitna area. The commercial trapping aspect is mainly predominated by marten trapping, which is a source of considerable income for the local residents. There is one small herd of caribou in the Nowitna area. It's relatively unharvested. Perhaps no more than 20 animals a year and the herd is about 500 to 600 caribou.

Mr. QUARLES. Anyone else wish to address that?

Mr. WILLIAMS. Dave Williams. I'd just like to say that the people of Ruby, who live right next door to the Nowitna, consider that their back yard. That is the prime winter use area of trapping for the people of Ruby, Alaska, and I think that probably the locals and most of these other gentlemen referred to as far as usages would go.

Mr. EVANS. Mr. Chairman?

Mr. QUARLES. Yes, please.

Mr. EVANS. My name is Charles Evans and I'm speaking for the coalition and I'm a fish and wildlife biologist, essentially. I've spent some time on the Nowitna, in fact, in the mid-sixties, and I have passed it from time to time since then. The arena is receiving a tremendous amount of use now as compared to what it did 10 or 12 or more years ago, partly due to the increasing range of seekers after fish and wildlife in the urban areas, partly because of the fact that it's relatively easy to land a plane on wheels, on a good part of the lower and central Nowitna River. And I get a distinct impression, without any really quantitative information, but a sufficient contact with the area during that period, that it is receiving perhaps more use than the people of Ruby would be entirely happy with, and I refer particularly to the apparent condition of the moose population.

The habitat is excellent, in my opinion, and we did fishery surveys in that area, but also kept an eye out for whatever else was there. The Nowitna is not unique to other inland Alaskan habitats, but there is a relationship between the Yukon River and the Nowitna in terms of flooding and addition of nutrients. During flood stages, there is perhaps more accentuated on the Nowitna than it is in most, but it is an extremely productive habitat and I don't believe that, in terms of the large ungulates, don't believe that that habitat is expressed at the present time. The capacity of the habitat is probably expressed at the present time in terms of numbers of animals. And there may be ——

Mr. QUARLES. Would you clarify that a little bit?

Mr. EVANS. In other words, the habitat, I believe, can support more moose than the present time. The State has had problems along the Yukon River as a whole and it hasn't come up here at this meeting, but there was a problem with emerging pressures between urban and rural residents on the uses of resources, and it is being handled as best it can be done through State regulations, and this is being handled, but it is an emerging problem and——

Mr. HARVEY. May I interrupt? When you say the habitat could support more moose, I guess my question is, then why aren't they there? I mean, are they just——

Mr. EVANS. I'll tell you quite frankly that I don't believe they're there because I think too many people are shooting them.

Mr. HARVEY. Oh, I see.

Mr. EVANS. People are shooting too many. The population of moose that is not up to the carrying capacity of the range. In other words, I just wanted to point out that this is prime moose habitat, as well as being a very intense or a high productivity small unit of waterfowl or water bird habitat, all water birds. It's heavily used by other water species also.

Mr. SHEPPARD. Mr. Chairman?

Mr. QUARLES. Yes.

Mr. SHEPPARD. My name is Pete Sheppard. I'd like to clarify the situation of the moose on the Nowitna River. About 1971 or 1972, we had some severe winters and we suffered a heavy winter kill of moose in that area. In addition to the heavy hunting pressure in the lower part of the river, which is both subsistence and sport hunting, there is a heavy, dense wolf population in the area, which was adding quite a bit to the mortality of the moose in the area. At present, the herd is now increasing and has been doing fairly well the last few years. The harvest that's recorded on our harvest ticket system is approximately about 70 to 75 moose a year for the Nowitna. However, a lot of the subsistence harvest is not reported and I would estimate it at probably twice to three times as heavy as the sport kill. Thank you.

Renewable Resources

Mr. QUARLES. Good. The next topic is the renewable resources, agriculture and timber.

Mr. HANSEN. Mr. Chairman, Dave Hansen, Department of Natural Resources.

First, the Nowitna proposal, as outlined by Secretary Andrus. It has approximately a half a million acres of agricultural potential lands in it, primarily in the Yukon and the Nowitna River Valley. None of those agricultural lands fall within the top half of the State's agricultural potential. The Nowitna proposal has 1.6 million acres of the State's 110 million acres of forestry potential land. Again, none of this falls within the top half of the State's forest potential lands. The majority of it falls in the seventh and eighth 10 percentiles for State forests.

Looking at the same information for the Yukon/Kuskokwim National Forest proposal set forth by Secretary Morton, for agriculture, it contains about 1.3 million acres of potential agricultural lands. This goes all the way down the Kuskokwim River Valley, as you're aware. About the majority of that is not in the top half of the State's agricultural lands. In fact, only 10,000 acres of the 1.3 million acres falls within the top half of the State's agricultural land. For forestry in the proposed Yukon/Kuskokwim National Forest, you have about 8.1 million acres of the State's 110 million acres of forest potential. Again, none of that falls in the top half of the State's total forest potential. Recognize that this assessment includes the forests of southeast, the forests that are in the national forest already. The majority of the land falls in about the seventh and eighth percentiles for forestry characteristics. Thank you.

Mr. GRAHAM. Hatch Graham with the Forest Service. I would like to point up again what Dave Hansen just said with regard to the percentiles regarding forestry. In a State as large as Alaska, to rank the entire State in one category is like comparing the Pacific Northwest timber resources with the Lake States, and so the interior of Alaska, when it is ranked with the southeast forests, does not display a real picture. You need to look at it on a regional basis. With regard to that, I would like to submit for the record a report done by a team from the Scandinavian and Finland countries that came into the interior in 1977, a Dr. Hilmar Holmen, associate professor of peat-land forestry, at the Royal College of Forestry at Stockholm, Dr. Peder Broathe, professor of silviculture, at the Norwegian Forest Research Institute and Dr. Aarne Nyyssonen, professor of forest administration and management planning, at the University of Helsinki. I think this ought to be of interest to the staff and does talk about the forestry potential of the interior of Alaska. With regard to the Yukon/Kuskokwim National Forest Area, as proposed in S. 499, the Alaska Planning Team of the Forest Service did an area guide on the central interior of Alaska that covered not only the proposal area, but surrounding areas and the relationship of the forest resource on Federal lands with the private sector, and we would also like to enter this into the record and make it available. With that introduction, I would like to ask John Galea of the Alaska Planning Team to summarize the forestry potential of this area and ask Alan Epps again to cover agriculture.

Mr. GALEA. Mr. Chairman, my name is John Galea, Forest Service. Again, I'll be talking about primarily those areas that were included in the original Yukon/Kuskokwim National Forest proposal of the Morton administration. We have over 80 percent of the area that is presently forested, which pretty much ties in with Dave's or the State's testimony. There has been identified by that, 1.2 million acres of commercial forest land, land that's capable of maintaining an industry similar to what's being maintained, for example, in the Lake States and a number of our southwestern States. The annual potential yield amounts to roughly 80 million board-feet per year, speaking about sawtimber equivalents. If we were to include the entire area (that would take in the Innoko and the Koyukuk Drainage, and that area identified in the central interior area guide), we have identified over 4½ million acres of commercial forest lands with an annual potential yield providing up to 290 million board-feet per year. Again, I'd like to point out that the productivity, the size and the potential yields of these interior forest lands are very similar to those found in the Lake States and southwestern States. They exceed some of the major present timbering industry in Siberia and the northern latitude forests of Russia, for example. Again, in using the statewide assessment as far as identifying or rating the forest potential, the interior forest again, ranked on the same basis that the State is following now, would rank just about equally with those areas I mentioned before in the Lake States region, and the higher ranking area that runs——

Mr. HARVEY. Excuse me. You said rank equally. Do you mean in terms of physical potential?

Mr. GALEA. In terms of physical potential, in primarily using the same criteria as far as——

Mr. HARVEY. Sure.

Mr. GALEA. Excluding the accessibility. For an example, in the Lake States area, they do have a transportation system.

Mr. QUARLES. Yes.

Mr. HANSEN. I would just like to clarify one thing here. In pointing out that our assessment includes the coastal national forests of Tongass and Chugach, I don't think we should take this so far that we overstate it. The entire national forest that exists right now would be included in our top 20 percentile, but even if you subtracted the total top 20 percentile, which also includes part of the interior forests of the Susitna Basin area and the Matanuska Valley and the Tanana Valley, the top 20 percent. Even if you excluded all of that, you would still have three 10 percentiles of noncoastal forests that have been assessed as being higher—from a developability standpoint—than this particular area. But that at the same time doesn't necessarily contradict what you're saying about there being value there.

Mr. GALEA. Yes. I don't believe it contradicts what's being said. If there is any weakness, it's the fact that the State does include two separate and distinct geographic regions as far as forestry potential and forest growth and they combine them, too, and set up a scale that probably isn't correct. It would probably be more correct to break the State down into two productive regions and then I feel that your rating system would be much more valuable.

Mr. HANSEN. And that, by the way, is being done as a result of the Forest Service comments last August.

Mr. QUARLES. Alan, did you want to talk about agriculture?

Mr. EPPS. Two general areas that I think need to be very quickly addressed as we look at this area, particularly the Nowitna, is that the Native corporations in that area are already highly involved and the agricultural enterprises have cleared a considerable number of acres or are in the prospect right now of utilizing this resource. One of the intriguing things we find as we move north in Alaska, until we get up into the Yukon Valley, is that from an agricultural standpoint, things improve drastically. The Kuskokwim is a major grazing area. Here again, I think it's one of these things that we need to take a look at, that relates to the private landholdings and possibly some of the State landholdings within the area, is the utilization of surrounding Federal lands in order to provide an economic base for grazing animals.

Mr. QUARLES. Anyone else wish to discuss renewable resources?

Mr. WILLIAMS. I'd like to just interject one thing. As far as what Al said, he's right and he's discussing a group of people who aren't represented here today and that's the village corporations. I know some things about the village corporations. Of course, they interrelate to a degree, but I can't really speak for them. I do know that

Ruby Village and Galena, not to leave them limited, did go into some agricultural experiment plots this year at hundreds of acres, Al?

Mr. EPPS. Yes.

Mr. WILLIAMS. But I can't really speak for those people. I do know that there is interest, particularly in that middle river area.

Mr. QUARLES. I'd like to ask you one question on that. Is their interest limited to their selection, to both the region and the village selection, or is there an interest for, for instance, grazing on Federal lands beyond their selection?

Mr. WILLIAMS. I don't think the villages have gotten that far into the planning and, you know, we try to consider them as a highly sophisticated group of people, as are sitting around this table, and they aren't. In this case, you're looking at some of the most sophisticated villages and what they're looking at, at least with Ruby, as far as I know, is a little test of grain and then some home vegetable production. At Galena, I think there was more grain. It was more of an experimental grain plot. It's hard to say, but I think we'd be looking at a real long-term thing. You know, it's like *Brown* v. *Board of Education*. Cultural change isn't going to occur within the time period that the (d)(2) issue is studied. I could see a potential some day for a desire for land leases in that area by village corporations, particularly when they come to the point and meet up against some hard deadlines in which they have to consider generating cash flow to pay taxes and other things.

Mr. GALEA. Mr. Chairman, I might add and probably tie onto what Dave said earlier, that the Native villages and the corporations located along the Yukon, Holy Cross north on up even to Tanana, Ruby and Tanana, and those villages on the Kuskokwim. As far as we can tell at this particular point, the forest resource is on their lands and to a great extent, by themselves, probably would not have as much success in establishing a viable wood utilization industry, were it not that the adjoining Federal lands would contribute or supplement their volumes and I think that's a pretty important factor that should be considered.

Mr. TILESTON. Mr. Chairman, Jules Tileston, Bureau of Land Management. Timber sounds like a good place to talk about fire, and it gets into this very thing of relationships. To date, we're dealing in this region and the region that we just discussed, an area where land uses have not even started. You heard Doyon talk about selecting lands for timber and timber values, which means that sooner or later, they're thinking about entering into a timber operation which has an impact and vice versa, and the impact is going to come in fire, because the Secretary of the Interior maintains the responsibility for maintaining fire control on Native selected lands until such time as they enter into it. He likewise is going to be entering into fire control on adjacent refuges and this sort of thing. There is a very real threat of conflict between the two areas. There are no clean answers, but it is an issue. It gets into what the Department has been doing at this point on fire control, and since there is not a lot of use developing, emerging, you take them as they come, you put them out. At the point you've identified a tract of land for timber production, even though it is not in timber production, it changes your entire fire control scheme for that area and you're dealing in this area with an extremely high fire-prone situation. All of the firefighting is by air access, as it would continue under any conditions, but habitat manipulation and this sort of thing is very important and particularly when you start talking about wilderness and some of the things that you're going into in the lower 48. You're also talking about conflicts of fire management, which has a direct impact on timber production and wildlife production and the two do not always behave compatibly. In many cases, they can be made compatible.

Mr. HARVEY. Jules, does the State assume responsibility in this area for fire protection of these lands or is this still Interior also?

Mr. TILESTON. They have assumed responsibility, but it's a cooperative arrangement right here. I would presume from the overall State pattern that in the long range, now, we're talking way down the pipe, this is an area where probably the State will be running the basic fire costs and Interior or other Federal agencies will be contracting with the State for fire protection and there will be a comparable tradeoff someplace else where the Federal Government will be protecting the State lands. Right now, in this area, BLM is doing it. That's going to change in the longrun.

Mr. HANSEN. Is it correct to state that this is one of the highest fire prone areas in the State? Or do you rate them that way?

Mr. TILESTON. I'd rather wait until this afternoon and come back on that, because I'll have to go back to the office. We do have a rating and we can tell you actually the historical plot of fires and again, we're talking primarily natural fires. But without access, you have the potential of fire escaping and then burning up somebody's timber resource, unless we've figured out what we're going to do.

Mr. EVANS. Mr. Chairman, Charles Evans. I'm no forester and I'm not a fire expert either, but along the Yukon and many of its tributaries, such as the Nowitna, my observation has been that the best timber is right along the rivers, the levees of the river, itself, and it's good because it's been protected from fire by these off-channels of the river, and I wonder if one of the foresters could comment on that. I think that's very important.

Mr. GALEA. John Galea, Forest Service. That's right. Probably, you know, if you've read something about fire history in the Interior, they tell you about the massive acres that burn each year. Relatively speaking, on a statewide basis, probably lesser acreages of commercial forests have been burned, related to noncommercial forest land. And particularly along the river bottom stands. However, this may not be true and probably is not true in your upland stands, where you do have commercial forests. I guess that answers your question, in part.

Mr. EVANS. It answers it to the extent that I'm still unaware of what percentage of the merchantable timber lies in that particular situation and how much of it lies in the uplands, and perhaps this is not a known figure.

Mr. GALEA. It probably isn't, and you can guesstimate right now, 50/50. Even in the river bottom stands, it's very seldom that you'll find trees there that grow beyond age 200 or 250, which indicates that they have been burned at one time, there has been fire occurrence there, it just doesn't occur as often.

State and Native Land Selections

Mr. QUARLES. Excuse me, but we'll have to interrupt and go onto the next, because we've got to complete this area. The next topic is the land selection question, both State and Native selections.

Mr. HANSEN. Mr. Chairman, Dave Hansen, Department of Natural Resources. Taking first the Nowitna Refuge proposal by Secretary Andrus, the State currently has about 90,000 acres at this time within this proposed area. We are interested in selecting 405,000 acres. All of these acreage lie right along the Yukon River. Both the north and south banks. The Native Corporations at this point have selected 200——

Mr. QUARLES. Would you again tell us what category that is in your selection, high, medium or low?

Mr. HANSEN. The Nowitna area is a high area for selection. It's of very high importance from accessibility to the Yukon River and recreation use in that area. 285,000 acres have been selected by Native corporations in the Nowitna proposed area. We're expecting that they'll probably retain 254,000 of those acres. The majority of these acres are also right along the river, both the Nowitna and the Yukon Rivers. What we see is the potential to have a State/private land/Native corridor of land along the river to provide for adequate access and use, as far as in that particular area.

Moving on to the Yukon/Kuskokwim Forest proposal, as proposed by Secretary Morton, the State currently owns 420,000 acres in the Kuskokwim River Valley, We are interested in owning nearly 2 million acres and we have a map up on the wall that's colored in orange and the orange State interest lands go right along the Kuskokwim River Valley, right through the heart of the southern half of the Yukon/Kuskokwim Forest proposal. The State has an extremely high interest in those lands being opened for selection.

Mr. SILVER. What's the basis for their selection?

Mr. HANSEN. The basis for the selection falls primarily on potential settlement lands in the future, especially a rural settlement. There is a very high land capability for a lot of these things. Agriculture and forestry, as we pointed out, it's moderate to low, but it falls into a—somewhat of a low value, multiple use scheme, but settlement is the primary interest that we have in this land. The Natives have selected 1.5 million acres of the Yukon/Kuskokwim National Forest area and we expect them to retain at least 770,000 acres.

Mr. WILLIAMS. The Nowitna, I think we've probably pretty well worked it over. Getting down on the southern end of the Kuskokwim, again, we've got selections for timber potential down there. Admittedly, it's not as high a potential, but combining our timber, maybe the village timber, and possibly some public timbers, we've always concluded there is a possibility for at least a local industry in the area. I think I'm going to defer to minerals to get into the heavy stuff.

Mr. SILVER. Can I ask one question of Dave? Do you concur with the Forest Service assessment that there's a need that some of this timber that's now possibly going to go into Federal ownership or with State—you said they wanted to select—is necessary to make regional land or village timber industry viable?

Mr. WILLIAMS. I think in almost every case that we'll look at, that that's the rule.

Mr. SILVER. So, yes, you need Federal timber?

Mr. WILLIAMS. Yes. I don't know of an area where we can really support ourselves.

Mr. GALEA. Mr. Chairman, relating to productivity and potential growth per acre in the interior as a whole, the forest has the capability of producing roughly 634 cubic feet per acre per year, on an average. The Kuskokwim is rated one of the highest areas as far as productivity and existing volume within the interior today and I just would like to point that out, and we will have these volume comparisons available for the record, if you'd like.

Mr. WILLIAMS. One other thing, Mr. Chairman, Dave Williams again. I think timber is a pretty long range prospect as far as we're concerned. I don't think you'll see us entering into the timber industry very soon. I would guess I will probably be retired. Some areas, we might get into it earlier.

Mr. HESSION. Jack Hession, Alaska Coalition. Mr. Hansen has identified two areas of State interest lands, which are in direct conflict with proposed wildlife refuge and wild and scenic river areas. One is in the Nowitna, along the Yukon River, itself, and the other is middle Kuskokwim, the Devil's Elbow stretch, which is suggested as a scenic river, I believe.

Energy Resources

Mr. QUARLES. If we could, let's move on to energy resources, oil and gas, uranium, coal.

Mr. MORGRIDGE. Dean Morgridge, Alaska Oil and Gas Association. This discussion covers a portion of the Yukon/Kuskokwim National Forest, which is such an extensive classification that part of the area that has oil and gas potential falls within this classification. The area I'm referring to is shown on map number nine and extends geographically to the southwest edge, somewhere beyond Big River and actually this trend goes all the way up to the Tanana River on the northeast. On the northwest bank, this is the area that we consider has some potential, is defined by the Kuskokwim River, the village of McGrath and another geographic reference for the northwest edge is Lake Minchumina, the Zitziana River and Tolovana, and on the southeast side, pretty well defined by the Alaska Range Mountains. This is a very large area and I want to discuss the whole thing under this Yukon/Kuskokwim National Forest classification and reserve comments about a portion of this area that is within your proposed addition to Mount McKinley Park on the north side.

Basically, the area we're talking about, which generally is referred to as the Minchumina Basin, is the topographic lowland that lies between the Kuskokwim Mountains on the northwest and the Alaska Range on the southeast, and it's a lowland that is drained principally by the Kuskokwim River along the northwest side and its northwest flowing tributaries that head in the Alaska Range. Geologically, the area is pretty solidly alluviated and is covered by a gravel apron that extends out from the Alaska Range on the southeast and extends all the way across to the northwest edge of the potential basin area, the main Yukon-Kuskokwim River drainage. Let me say that, geologically, this is one of the most poorly understood, most poorly mapped areas of Alaska and my remarks, therefore, are going to be rather brief. Because there is so little information in the public record, it shouldn't detract from the petroleum potential of the area.

Just a comment about the sedimentary section that very well might underlie portions of this Minchumina Basin area. The information that is available to us in the public records is very encouraging. In fact, there are many of the requisites that are necessary for major petroleum producing areas, including principally a very thick sedimentary column. Most of our knowledge of the geology of the area is, of course, gained from the bedrock uplifts that lie to the northwest, the Kuskokwim Mountains, and to the southeast in the Alaska Range and from a petroleum standpoint, our interest in this sedimentary column begins with the Lower Paleozoic.

Mr. QUARLES. Thank you.

Mr. BARKER. Jim Barker, Bureau of Mines. With respect to energy and resources, I'll refer to the map behind me and overlay, with the map under it showing the outlines of the (d)(2) proposals. There are two sites that are prospectively valuable for hydroelectricity. One on the Yukon River and the other just to the north of it. There is also a geothermal area that extends into the Nowitna proposal. That's this area in red over here. There's some minor coal and Cretaceous rocks that are known to the south, but they're pretty far outside the borders of the (d)(2) lands. Sedimentary uranium is considered favorable.

Mr. QUARLES. Dave.

Mr. HANSEN. Dave Hansen, State of Alaska. In looking at the two proposals from an energy standpoint, we look first at the Nowitna proposal as set forth by Secretary Andrus, and we find in the Nowitna proposal no areas identified by our assessments as oil and gas potential of any kind. For coal, no areas for coal. Uranium, we have identified 748,000 acres with uranium potential in the Nowitna proposal, 266,000 are rated No. 3 in the uranium rating system of 1 through 5, and thus you're starting to find some significant uranium on the 266,000 acres.

Mr. QUARLES. Where are these within the Nowitna proposal?

Mr. HANSEN. I would have to check that and get back to you.

Mr. QUARLES. If you will.

UNIDENTIFIED VOICE. It does show up, though, doesn't it, Dave, that it's in the selections or 62 percent of it?

Mr. HANSEN. Sixty-seven percent.

Mr. QUARLES. I'm sorry. Could you repeat that, please?

Mr. HANSEN. OK. Sixty-seven percent is in the Native selections and that means that it's on the river and it's upland, just above the

Yukon River, where most of the Native selections are in that area. And the State interest lands or the State lands that we now own, which have been overselected by the Natives, contain 78 percent of the uranium deposits of the top uranium, so the majority is in State or Native selections status now.

Mr. BARKER. Mr. Chairman, Jim Barker, Bureau of Mines again. The area, I think, of uranium potential that's been referred to is what we have shown here with a purple line to the north. The areas to the north, immediately, of the river and to the southwest of the Nowitna proposal. I think it's how you draw the lines of the proposal. Some of them I've seen show the border of the proposal taking in some of the lands to the north of the river, extending further to the west. And if that's the case, then it will take in areas that are not only favorable for uranium, but also tin and tungsten.

Mr. HANSEN. Dave Hansen again for Department of Natural Resources. On the Yukon/Kuskokwim National Forest proposal as set forth by Secretary Morton, about 1.2 million acres has some oil and gas potential, however, it is all rated in the 9th and 10th percentiles for oil and gas potential, so it's very low. That's compared to the 113 million acres of oil and gas potential in the State. There is no coal potential that has been assessed in this area. About 2.8 million acres of the 105 million acres that have uranium potential in the State can be found in the Yukon/Kuskokwim National Forest proposal area. Again, the vast majority of that is in the fourth level, 132,000 acres is in the third level.

Mr. QUARLES. That's on the 1 to 5 scale?

Mr. HANSEN. The 1 to 5 scale, yes, for uranium. Thank you.

Mr. WILLIAMS. Although no coal has been discovered necessarily within the proposal area, south and east of the proposal area, south and west of McKinley Park and the extensions to McKinley Park, 2 years ago there was announced a significant coal finding. Seams known to be up to 200 feet thick, suspected possibilities of 600 feet of coal, that lies on four townships selected by Doyon Ltd and then goes over into State lands. Dave, do you know how much you guys got of it?

Mr. HANSEN. I couldn't tell you offhand.

Mr. WILLIAMS. It's a significant bank account for Doyon Limited. Chuck Herbert is with me this morning and he can give you some more technical information.

Mr. HERBERT. Well, we're familiar with this. He's described the thickness and that's all. There are two marvelous exposures and probably a previously unknown huge coal basin exists there, stumbled into. When you have to wait years to find 200 feet of coal exposure, that's pretty well unknown country, but the main thing that comes up, the first question is, well, what good is coal in that district? Well, the answer right now is, no, it has no value except for a little local fire. But we look on it entirely differently. Looking down the avenue 20 years from now, a coal deposit like that is going to be extremely valuable for the products that can be made from the coal, not shipping it. It's not direct shipping coal. It's a high volatile coal and it can be mined rather cheaply. It can be used, and what you're looking at, you're going to have a product pipeline from that place. I think it's a very, very important location for the future of the Natives.

Mr. QUARLES. Is this mostly on selected lands again?

Mr. HERBERT. It's on State land and on the Native lands, the Doyon Lands. It backs up what Dean Morgridge has already said about the basin. If it takes years to find a coal outcrop, how long is it going to take to find oil that might be underneath?

Mr. BEVINETTO. Are the coal deposits strippable?

Mr. HERBERT. Yes.

Mr. WILLIAMS. Dave Williams again. The problem we see with this again is the offsite impact on (d)(2), both on the Yukon and Kuskokwim, of course, particularly if it were in the wilderness, and coming from the east of McKinley and the McKinley extensions.

Mr. HARVEY. What would the impacts be, can you clarify that?

Mr. WILLIAMS. OK. When we're talking about problems with classification and we're talking about——

Mr. HARVEY. Access and clean air?

Mr. WILLIAMS [continuing]. Access, clean air, clean water. We're just on the upper end of the Kuskokwim. These offsite impacts could take the value of the resource away from Doyon, if and when the time comes.

Nonfuel Mineral Resources

Mr. QUARLES. If we could, then, let's move on to consistent mineral values. Does anyone wish to speak to that?

Mr. HERBERT. Just referring directly to the Nowitna area, it lies within a well-established mineral belt within the boundaries that have been laid out through years and years of prospecting and work in there. Since I broke through the data a little while ago and mentioned a deposit that's on the Doyon lands that had been previously unknown, incidentally, it lies just outside this mineral belt, so it's actually wider than we thought. If you'd looked at maps a few years ago or asked any of us if that's a good area to prospect in, we probably would have said, no, it had nothing known about it, nothing there, and yet we think it very well could be one of the important zinc districts. So I really think that the whole part of the southeastern part of the Nowitna area, where there is some mineralization known or particularly, we're not talking about the flats, does have high potential for minerals and I should point out that there is active mining going on up the Nowitna River now. A man uses the Nowitna River to bring his supplies up, he's mining up in the area near the mouth of the Susulatna and below the Titna and, incidentally, there has been, years ago, some platunum reported up on the Titna River, which is just at the southeastern adge edge of the Nowitna proposal. Other than that, we don't know too much about it. It's another one where we think that if the land was not proposed to be withdrawn, there would be prospectors crawling all over it right now.

Mr. MENZIE. Dave Menzie, U.S. Geological Survey. The area that is included in the Kuskokwim Forest includes areas in our report which are considered to have—considered under area four, which is a mercury area, and I cited the figures under the Innoko area as to what the possible number of deposits and sizes of deposits should be for that area. Also in this and in the Nowitna area is a belt of geology, we have labeled eight. In the area labeled eight, there are three known contact metamorphic deposits, one of which has produced 1,600 kilograms of gold, copper was also produced, but not shipped. It also has a potential for gold placer, area eight. These would be skarn copper deposits and the relative figures on these would be—in terms of tonnage—90 percent of the deposits would have tonnages greater than 0.08 million tons, 50 percent would have tonnages greater than 1.4 million tons, and 10 percent would have tonnages greater than 24 million tons. The copper grade of such deposits: 90 percent of the deposits would have tonnages greater than 0.08 million tons, 50 percent would have tonnages greater than 1.4 million tons, and 10 percent would have tonnages greater than 24 million tons. The copper grade of such deposits: 90 percent of the deposits would have grades greater than 0.86 percent copper, 50 percent would have grades greater than 1.7 percent copper, and 10 percent would have grades greater than 3.5 percent copper. There is also a correlation with tonnage of ore in gray, which means that with the negative correlations there, that the larger deposits might have lower grades associated with them.

Also within the Nowitna area is an area marked 10. This is a small area which has potential for podiform chromite and also asbestos. The podiform chromite deposits would—this would be tonnage of CR_2O_3, we would expect 90 percent to have greater than 15 tons. Fifty percent to have greater than 200 tons, and 10 percent to have greater than 2,700 tons of CR_2O_3.

Also within the Nowitna area are areas marked 11. These are areas with potential or which are permissive for the occurrence of massive volcanogenic sulfide deposits and I refer to the relevant grade tonnage numbers for these deposits under the Innoko, as I won't repeat them.

Also the area contains elements of area marked 14, and these areas have potential for placer gold, polymetallic veins, uranium, thorium, disseminated in igneous rock. Possible tungsten, tactite deposits, and tin granites and also for felsic and intermediate volcanogenic sulfide deposits. Again, the relevant grade and tonnage numbers were mentioned previously under Innoko.

Mr. BARKER. Jim Barker, Bureau of Mines. The area I'm addressing is the area of the northern part of this region. It's limited to the Nowitna withdrawal, itself. The records indicate that approximately 390,000 ounces of gold have been produced in the adjoining district of Ruby, Poor Man, about $70 million at today's price. At this time, there are about 12 people working there. Most of these are along Long Creek. There has been recent placer activity immediately to the south and southeast of the withdrawal areas. There is a hard rock prospect immediately to the west of the withdrawal that is favorable for silver and lead. The region on its northern side abutts onto an area favorable not only for uranium, but also for tin, tungsten, and base metal vein type deposits. There has been a fair amount of exploration in that region this past year. A prospect was located about 10 miles north of the proposed area, as we have it drawn. I believe that property was staked for uranium, although we have no way of confirming that at this time. This is part of a major zone of granites, which extend through the region from the northeast. The southeastern portion of the Nowitna withdrawal has a moderate potential, but the information available is scanty. The region is prospectively valuable for these local genetic type deposits, for stratiform type deposits, for carbonates. These would be base metals, lead and zinc, primarily. There is a small region in about the center of the withdrawal that may be valuable for chrome and asbestos.

Mr. MENZIE. Dave Menzie, Geological Survey. There is Geological Survey work going on in the northern part of the Nowitna Region, in the Ruby Quadrangle, level III geological mapping is presently underway and in the Medfra Quadrangle, work on regional resource assessment is currently underway in both these areas.

Mr. QUARLES. Dave.

Mr. HANSEN. Looking at it from a statewide perspective on the Nowitna Refuge as proposed by Andrus, I find that about 1.7 million acres of the refuge area have some type of hardrock mineral potential; however, with the exception of 68,000 acres, it is all rated in the bottom 60 percent. The 68,000 acres rated above that are rated in the second 10 percentile of the State's mineral potentials and 66 percent of this acreage has been selected by the Native Corporation at this time. In the Kuskokwim River proposal set forth by Morton, about 3.4 million acres of the proposal area, which is around 9.7 million acres, has some hardrock mineral potential. Again, the majority of it is rated in the fifth 10 percentile or lower and the top 40 percent, they have about 160,000 acres that's ranked in the top 20 percent and 23,000 acres in the third 10 percentile, the top 30 percent.

Transportation and Access

Mr. QUARLES. Moving on to the final topic for this area, the transportation access question. Does anyone wish to speak to that question?

Mr. UMLOFF. Yes, Chairman. John Umloff, director of transportation and planning, State DOT. I'd just like to show in this particular area that again, in terms of a natural access, looking at this access to the resources again, we have a major corridor which lends itself to surface transportation. It does come down through what we call Kuskokwim, providing access, ground access, to the main transportation, rail highway, and also this linkage could provide new access into the tidewater. Again, these are particular corridors that are not specifically identified in terms of width or exact location, but they were picked on sort of a natural basis that they do lend themselves to access into those areas. We do have a comparison, for example, which was made in terms of energy requirements for access into these areas and we have a couple of curves with Mr. Thomas from our interior division. Bob, if you would, please, just take a minute to show the comparisons that have been made in terms of energy requirements for access into these areas?

Mr. THOMAS. Bob Thomas, Department of Transportation. You've heard an awful lot this morning about the minerals that are in this part of the country. I'd like to take a point and look at the savings of energy that's possible by overland transportation. Somebody mentioned this morning, there's something about 20,000 people down here. That's about—under current figures, just for continued lifestyles, about 100,000 tons a year going into the area. As the area grows, more tonnage has to go into the area. I've done a fuel comparison/use budget between aircraft and by truck. If we were to haul 200 rocks, that's 182,000 pounds, in the Bethel area, by aircraft, we would have used 31 million gallons of fuel. If we were to haul that same amount of tons into it by truck, we would have hauled 31 million gallons of fuel. The difference is that this amount of fuel would have been to construct a facility that you could have continued to use at a low rate of fuel. This amount of fuel was turned into smoke. Any time you get beyond this point, you start getting energy savers. Now, mind you, this is not economic at all, but it is reflected economics, because the specialty aircraft costs, transportation costs, are geared to the price of fuel and as the price of fuel goes up, this becomes more and more economical.

Mr. **Harvey**. You're not factoring into that any low-level economics, even a fuel budget for construction maintenance of highways?

Mr. **Thomas**. There is a fuel budget for construction of the roadways right here. A budget for maintaining the highway doesn't even reflect the width of the line here. We did check into that; yes. However, most of the fuel is used in constructing the roadway. Now, to compare it to a train, this particular curve up here would be about eight times flatter, because a train is even more efficient. However, it would probably take a considerable amount more of fuel to build a railroad, because of the energy requirements going in to building the track, developing the steel, and therefore you will have intersections along this line somewhat farther out, but it would be there at some point. I'm not sure exactly where, because I don't know what amount of energy requirements goes into the making of steel. Now, the numbers seem awfully big, but I've done a little comparison on a road that we just—it's quite a controversial road in Alaska, and that's the North Slope road. Because that amount of fuel has already been invested, we start off with zero with both the truck and with both the aircraft, and the fuel savings at 100,000 tons is about 6.3 million gallons. Every time you haul 100,000 tons up over that North Slope road from Fairbanks to Prudhoe Bay, you're saving about 6.3 million gallons. That's enough to run all the Fairbanks estimated traffic till 1995 for 100 days, and that's the kind of fuel savings we're talking about when we're talking about overland corridors versus aircraft. That community in that area now is served, particularly almost exclusively by aircraft. In fact, if you can get it into a plane, we'll take it down there. And so I thought we ought to point this out, because we're faced with trying to develop a transportation system that is recognized as being inadequate and we have to do something about it, and this is one of the ways we're looking at.

Mr. **Hansen**. Have you looked into the relative costs of water transportation under those same terms?

Mr. **Thomas**. Not on the same energy-type terms, but it is much more economical by water. However, we have some problems with water also in that it's seasonal and right now we're—people who have the cash economy to cope with the seasonality of the thing.

Mr. Tileston. Jules Tileston. A question of Bob. Isn't there a primitive road net now through the Poor Man area, which would be immediately to the west, for all that mining area? I seem to remember seeing from the air, scattered surface access, probably very poor, probably follows the Iditarod Trail, but there is surface access at least at certain times to the area to the west.

Mr. Thomas. To the west?

Mr. Tileston. To the west, coming directly out of Ruby.

Mr. Thomas. From the north?

Mr. Tileston. Yes. But isn't there a primitive road net in there now?

Mr. Umloff. That's the Ruby/Poor Man Road, yes.

Mr. Thomas. Yes.

Mr. Tileston. So there is surface transportation in a very skeleton way outside the area that we're talking about?

Mr. Thomas. Yes, very skeleton.

Mr. Somerville. My name is Ron Somerville, Alaska Department of Fish and Game, and I—in recapping some of the Fish and Game things, just a couple of points I'd like to highlight, too, and one is, I noticed throughout the whole system, we have an extensive network of streams particularly and these streams serve as major corridors for Fish and Game activity. Most of it associated with snowmachine access, particularly in the winter, motor boat access for transportation of goods and service roads to trapping cabins, some of it, as well as aircraft access. A lot of the lakes and streams that are accessible by small aircraft are extensively used for sightseeing, fishing, hunting, trapping and I just wanted to plug this in, whatever you do in the wild and scenic rivers, wilderness designations, the categories that affect these are going to affect the people in those areas.

Mr. Hansen. One maybe final comment on the entire morning as far as the whole western region, from the State's standpoint. Our selection interest is primarily focused on the two river corridors and our highest interest is in the Nowitna Area, along the Yukon River and also along the Kuskokwim River, though it's a much lower priority. A lot of our interest in those areas, as well as multiple use, is settlement and also accessibility for river transportation and recreation. One other comment is just on an overall resource basis. We have submitted to you, resource summaries for all of the lands included in the western region, not by proposal, but the entire region, and in looking at those, you'll find that for your non-wildlife resources, that generally this area doesn't rank as high as other areas we'll be getting into in the next few days, and the conflicts with the individual proposals are much less than I think what we'll see later on this week when we get over into central and northern Alaska.

Wild and Scenic Rivers

Mr. Tileston. Jules Tileston. The Melozia or Melozitna was not discussed. This was looked at in 1972 by the Bureau of Outdoor Recreation as a potential wild and scenic river. It was not studied at that time simply because we were concentrating in the other bigger (d)(2) areas. It does qualify, it has very scenic values. Its values are entirely different than those that you find on the Nowi, Nowitna, to the south.

Mr. QUARLES. Yes.

Mr. HESSION. Looking at the time, I'd like to submit a summary of the wild and scenic rivers in the region, but I'd like to highlight for a moment one river, which was overlooked in the initial BOR survey, and that's the Kisaralik. Down in the Togiak country, in the Yukon Delta subregion. The Kisaralik is a lake/stream system which assures easy access and a continuous flow. It's a clear water stream, which gives it high aesthetic values. It has superior sport fishing values, according to a BLM study. It's a challenging, but safe floatstream. Rapids and falls can be easily portaged. It has excellent open country hiking, including Alpine tundra hiking, but what probably sets it apart from some other rivers in the region is its superior, I think wildlife viewing opportunities. Bear, moose, but especially birds. Raptors, as was mentioned earlier, in the upper watershed, waterfowl, including trumpeters in the delta area, and song birds in numerous—numerous song birds, perhaps up to 90 species of birds along the entire river.

Mr. QUARLES. Jack, what did you say the status of it was? I'm sorry. It had not been studied or what?

Mr. HESSION. It had not been withdrawn as (d)(2) and had been overlooked in the initial BOR survey. It flows primarily across (d)(1) lands, but in a couple of the legislative proposals, it is identified as a wild river

THE SOUTHEASTERN REGION

Mr. QUARLES. The workshop will please come to order. For those of you who weren't here this morning, I'm going to repeat the arbitrary injunction of this morning, to continue throughout these workshops, that there's to be no smoking in this room. If you really have to smoke, go outside.

This afternoon, we're turning to the subject of southeastern Alaska and I think I'll turn the meeting over to Dick Stenmark from the Federal/State Land Use Planning Commission, who will give us a brief overview of the region.

Mr. STENMARK. Southeastern Alaska, as most of you know, is the Panhandle off to the southeast of the rest of the State. It's about 25,000 million plus acres in size, depending upon where you draw the western limit to the area. Basically, it consists of a narrow mainland strip down through here, some up in this area, as well as an archipelago of islands down through here, some of which are some of the largest islands in the United States and its territories. Generally, a mountain area, relatively little flat land. Extensive glaciation in the higher mountains here of the coast range and back up here around Yakutat. There are extensive rugged mountain ranges, especially down through the St. Elias Mountains and the Fairweather Range and again down through the coast range of the mainland. More gentle slopes tend to occur in the island group out in here, Prince of Wales, Kouiou, and so on. Though there's been considerable timber harvest in southeastern Alaska, the area is still by and large in its natural state. Climate is heavy snow and rainfall with the heavier precipitation belts lying to the south and most of the time out along the outer coast here or at certain elevations. Several principal communities down in southeastern Alaska, Juneau, Ketchikan, I believe both have about 10,000 people. Sitka is not too far behind and then several additional scattered Native communities and logging communities on the Prince of Wales Island, up at the head of the Lynn Canal, Hoonah, up in this area, Petersburg, to name a few.

Transportation in southeastern Alaska is somewhat limited. There are few roads except the area is connected to the Alaska Highway, via the Haines Cutoff here. There's another road just about completed from Skagway, on up near Whitehorse and a few roadways around on some of these scattered islands and on the mainland. Most of these roadways, or the communities are connected by the ferry system that operates in southeastern Alaska.

People rely to a great extent on aircraft and boats to get around in this area, and there are scheduled and chartered aircraft and boats available. The existing Federal reserves in southeastern Alaska are principally the Tongass National Forest here, with a Yakutat unit up in this area northwest of Glacier Bay. Within the National Park System are the Glacier Bay National Monument here in yellow, the Klondike Gold Rush National Park up in this area north of Skagway and the Sitka Historical Park at Sitka. There are three small island refuges, Forrester Island, Hazy Island, and St. Lazaria off the coast here.

Proposed additions to the forests in the (d)(2) lands legislation consist of basically three areas that were left out of the original forest reservation because of the great amount of snow and ice and the lack of forest in these areas. One was called Cape Needle in here, another Juneau ice field up in this area. Most of this area up above Haines has been State selected, and then the other area lies northwest of Glacier Bay National Monument in back of the Yakutat Forest unit. These are proposed, basically, as additions to the forest. Part of this upper area is proposed as an addition to the forest and the part up through and including the Alsek River is proposed as an addition to the Glacier Bay monument.

There are a number of wilderness and wilderness study area proposals, then, in southeastern Alaska, as well as a couple of different wild river proposals, and I'll go through these briefly. Let's see here. Well, I'll start off up near the Yakutat area, the Situk River is proposed as a wild river proposal.

Further down on the mainland, then, is the Stikine River proposal, coming out of Canada in this area. Admiralty Island is one of the larger wilderness proposals here, slightly over a million acres. Another large wilderness proposal is the Misty Fjords area down in here. A mainland section and then part of Revilla Gigedo Island, west of the East Behm Canal in this area. The Stikine Le Conte

Wilderness is right in this area, where the Stikine River comes through the Coast Range. West Chicagof/Yakobi up in this area. Here's Duncan Canal down here on Kupreanof Island. Etolin Island is right in this area. Karta, down on Prince of Wales Island. Tebenkof, over in this area. Dall Island on the southwest corner here. Idaho Inlet, Mud Bay. I'm getting off into some wilderness study areas now, with Dall Island. Dall Island, Idaho Inlet, Mud Bay. Kadake, it is here. North Kruzof, up in this area. Pavlof, Rocky Pass, Saint James Bay, Salmon Bay back down here again on Prince of Wales, Parker Lakes and the Sweetwater Honker Divide right in this area, also on Prince of Wales. One more we haven't hit yet is the Yakutat Forelands up in this area, that's a proposed wilderness under one of the bills, and I believe that covers them all.

Mr. QUARLES. I think we've decided to divide the discussion of southeastern region into four general areas, although "area" is not the proper term and after I'm done, you'll see why. We thought we'd begin with a discussion of the additions to the national forest, plus the Glacier Bay proposed extension. The second area we would discuss would be Admiralty Island. The third area in Misty Fjords and the fourth would be elsewhere in southeastern Alaska. We urge, once again, that each person who speaks on any of these items, since now we are confronted with trying to cover four areas, instead of three as we did this morning, to keep his or her remarks as brief and succinct as possible.

Scenic Landscape, Historic, and Archeological Values

Mr. QUARLES. Beginning with the additions to the national forest and to Glacier Bay National Monument, who would like to speak to the scenic, landscape, historical and archeological values involved?

Mr. ZYLINSKI. My name is Joseph Zylinski of the Forest Service. The Forest Service in southeast Alaska, as you know, has been involved in an intensive planning effort for the last 2 years and the National Forest Management Act of 1976 has reinforced those planning efforts. At the present time, there are six task forces working on inventorying various commodity and amenity values in southeast Alaska, preparatory to developing land allocation alternatives, which will then be the subject of environmental statements, leading to the development of a National Forest Management Plan for the Tongass National Forest in southeast Alaska.

Here today with me and prepared to explain to you what data have been developed by a specific area—or collectively, if you wish—are Rai Behnert, who is to my left, who is the leader of the Tongass National Forest Land Management Planning effort, and directly behind me, Ray Clark, who is the director of recreation, soils and water management in the region. You'll find that Mr. Behnert, in his presentation, has got a lot of materials to present to you. It's going to be a problem, I guess, to attempt to have you sort it out in a manner which would be most helpful to you.

Mr. BEHNERT. In relation to the proposed addition, basically, we have not made specific inventory of those areas because of their exclusion to date from the national forest, however, the areas are fairly well known because they are so closely adjoining and related to the forest. These areas lie primarily between the national forest and the Canadian border. They're primarily typified by a vast ice field, high mountains that are relatively devoid of major vegetation, other than lichens. There is a small amount of wildlife habitat occurring in the Yakutat addition that is proposed and this is limited to the periphery of Harlequin Lake. The rest of the area is typified by predominantly glaciated landscapes that are largely devoid of wildlife or vegetation. In addition, the acreages that we have compiled for two of the units, the Juneau Ice Field and the Kate's Needle Unit, are as follows: the Juneau Ice Field, there are approximately 479,000 acres, and for the Kate's Needle addition, about 470,000 acres. We have not compiled acreage on the other unit, given the uncertainty of its division between us and the National Park Service, as proposed.

Mr. QUARLES. Would anyone else like to speak to these values as they relate to the additions or to the Glacier Bay National Monument addition?

Mr. RITTER. My name is Tom Ritter, superintendent of Glacier Bay National Monument and I'll address these remarks specifically to the scenic values of the proposed additions to the monument.

The area is typified in relief by Mount Fairweather, 15,300 feet, which is indicated on the map at the front of the room, and then ranges down to sea level. Within this relief range, there are a number of deep gorges, glaciers, and forelands which are an extension of the existing area, but within that, there are a number of biologic features and natural features that are unique to that part of southeast Alaska. The Deception Hills area, which is northwest of Mount Fairweather, contains a very mature vegetation portion of southeast Alaska that is older than any other portion of the district. The area is bounded on the north side by a canyon, carved by the Alsek River, which is the only avenue bisecting that range of mountains, the Fairweather Range or that particular Southeastern Range, which allows wildlife and biologic features to form.

Mr. QUARLES. Would anyone else like to speak to these? Yes, Rich.

Mr. GORDON. Richard Gordon, Alaska Coalition. I might comment that the scenic analysis map now is so hidden that if anybody wants me to point out anything. I'll just point out to one of these. Let me know. The overwhelming importance visually is based on one feature, the lower Alsek River Canyon, which is a wide U-shaped canyon. From the river, it is possible to see directly to the top of the high, 12,000- 15,000- foot peaks of the Fairweather Range, and I don't know of any other river where this direct view is possible. The river enters the State in sort of a bowl. You have the feeling, because there is a canyon or a narrow gorge at each end of this bowl, that it's an enormous bowl with the river flowing through it, rimmed by high mountains. It's a visual experience quite different from the rest of the Alsek River.

The other major feature on the river is a 6-mile-wide glacier, which paths off directly into the river and the amounts of ice that come off at any one time are beyond all comprehension. The largest I've ever seen in Alaska. It's a very active feature, and the dynamism of the caving ice, plus the sweep from this bowl, from this basin, up to the high peaks of the Fairweather comprise the primary scenic resource.

Mr. BEVINETTO. What is the land classification in Canada, bordering these parks?

Mr. RITTER. The Canadian portion, which is just east of the park, is in British Columbia and it's Crown Provincial Land.

Mr. BEVINETTO. And the degree of protection provided by crown provincial land is?

Mr. RITTER. Well, it's land that has a similar protection to public domain.

Mr. GORDON. I might add, the upper two-thirds of the Alsek River and its main tributary, the Tatshenshini, are enclosed primarily within the Kluane National Park in the Yukon Territories. The gap separating the Yukon Territories from Alaska and British Columbia has been studied by the Parks and Recreation Branch in Victoria, but at the moment, no park has been created. I suspect that if this Glacier Bay addition goes through, they probably would make a contiguous Provincial park up there.

Mr. BEVINETTO. Thank you.

Wildlife and Fish Resources and Uses

Mr. QUARLES. Let's turn next to the question of wildlife values in the additions to the monument and to the forest.

Mr. BEHNERT. Rai Behnert of the Forest Service. The additions that I spoke to before were in reference to those that were additions to the forest. They did not encompass the Alsek part that has been proposed for addition to the monument. Of course, in relation to that portion of the Yakutat area, the wildlife values that have been inventoried in that particular geographic area include moose, brown bear, deer, black bear, goats, and wolves, making up the big game species, and also presenting the hunting opportunities in the area. Furbearers include mink, otter, ermine, coyote, and wolverine. Waterfowl habitat is excellent and serves a variety of birds and major flyways. Species found include a variety of ducks, geese, swans, and brants. Those constitute the inventory data on that particular area. Again, to couple back to the scenic quality of the area, it is also viewed as a superior park.

Mr. JENSEN. Mark Jensen from Alaska Professional Hunters, and I would say that in that area, we have some of the biggest brown bear yet that there is, any place that I know of in southeastern Alaska. It's very good coverage for them there and very good feed habitat there for them. Also the moose pattern in the flats there, back to the foothills, is extremely good. The one thing that they have to put up with that has had some effect on the herd is high snow levels in some winters, and wolf predations. Those two things have fluctuated the herd quite a bit.

Mr. SILVER. Are you speaking now of the Alsek addition to the National Forest?

Mr. JENSEN. Yes.

Mr. QUARLES. Which area were you speaking to?

Mr. JENSEN. For the addition.

Mr. SILVER. To Glacier Bay?

Mr. JENSEN. No, by the Alsek.

Mr. SILVER. OK, I'm sorry.

Mr. JENSEN. Yes.

Mr. MERRIAM. Mr. Chairman, my name is Harry Merriam. I'm a game biologist with the Department of Fish and Game. I've been a resident of Alaska for 25 years and a biologist in southeast for just a little over 18 years. I would like to submit to the committee a report covering what the Department of Fish and Game consider our most important wildlife areas in southeast Alaska. This report gives a résumé of all of the areas, I believe, which will be spoken on today. It also includes a map which was prepared by the Forest Service in conjunction with their planning, which shows the location of the areas which the Department of Fish and Game consider the most critical fish and wildlife habitat in southeast.

The entire Yakutat area, we will speak to further, but the Alsek River, itself, it has good moose population. It has never been as high a producer as some other portions of Yakutat. The populations today are fairly low, but it has the potential, it has produced a good moose population in the past. In the upper portions of the Alsek, the mountain goat population, and it's a good area for bown bear. The whole Yakutat area is an important wildlife area and we're going to bring this out in almost every area we talk to today. We will say that they're either important or very important wildlife areas, and the reason for this is because the majority of these areas we will be speaking to, that's one of the major reasons they have been considered, is because of the importance of wildlife in that area. The areas we'll be speaking to are some of the prime wildlife habitats of southeast. Mr. Armstrong, our sport fish biologist.

Mr. ARMSTRONG. I'm Bob Armstrong, I'm the research supervisor for the sport fish division for southeast Alaska and we've prepared a list of the number of freshwater systems that we consider to be very important in these areas that are under consideration an are affected by the (d)(2) lands proposals, and I would like to submit this today for the record. In addition, in speaking to the Alsek River, this particular system is one of the most important chinook salmon systems in southeastern Alaska. There are three systems in southeastern Alaska that have estimated chinook runs of over 10,000, and the Alsek River is one of them. In addition, this system has been indentified as one of the top coho producing systems in southeastern Alaska. The Alsek addition to the glacier Bay National Park has two areas which we've identified as being high quality sport fishing waters in southeastern Alaska, and in addition, it has four excellent steelhead systems, but I think the most important to the Alsek is its importance as a chinook salmon system.

Mr. SILVER. Do you have somebody who's going to speak to the commercial fishing in this, or is it appropriate to ask some questions of you about any commercial fishing that might be taking place on the Alsek?

Mr. ARMSTRONG. I'm not very familiar with the commercial fishing up there. I know that they had a gill-net fishery near the mouth. Perhaps Bob Boddy here could speak to that.

Mr. BODDY. My name is Robert Boddy. I'm a sport fish biologist, retired from the Alaska Department of Fish and Game. The Alsek has a number of people who depend on the king and coho run for their livelihood in that commercial fishery. I don't have the figures at my tonguetip to give you, as to what the production is. Suffice it to say that they are flying those fish out of there. It takes a DC–3 to haul that quantity of fish, to get them out of there. Does that answer your question?

Mr. SILVER. Where is the strip located that they fly out of?

Mr. BODDY. The strip is at what was Mortenson's Lodge, near the mouth of the river.

Mr. SILVER. Inside the park?

Mr. BODDY. Yes; it's on the east side of the river.

Mr. BEHNERT. I have some additional data on that. There are some key fish camps located in the area that is presently national forest land, and a processing plant that is serviced by an airstrip capable of handling the size of aircraft that was mentioned. There are also some public recreation cabins associated with these airstrips, and some outfitter guides to operate from the area to handle the fishermen and hunter use. Also I might point to the map that we have on the wall, which is called an amenity composite, which does provide an overview of some of the fishery, wildlife and what we call ecotype diversity information.

Mr. BEVINETTO. I need a point clarified. Were the 17 lodges referred to in the Glacier Bay addition or the addition to the forest?

Mr. BEHNERT. I could respond to that. The 17 sites mentioned were in the present National Forest inclusions that are proposed for transfer in this particular delineation. In other words, there's a small portion of the proposed addition that is not actual forest, and that is what those related to.

Mr. BEVINETTO. Are those commercial lodges or privately owned deeded land?

Mr. BEHNERT. Those are fish camps that are used seasonally and there's one processing camp that is also part of that. There are two guide camps in the area that are used again seasonally, to my knowledge.

Mr. BEVINETTO. Thank you.

Mr. QUARLES. Yes.

Mr. SILVER. Are there any professional hunters or guides who operate in the proposed additions to Glacier Bay?

Mr. Jensen. Yes, we have one that has an area there, right there, and he lives in Yakutat. The area includes the Alsek area.

Mr. Harvey. When you say, sir, that he has an area, what do you mean by that? He uses an area?

Mr. Jensen. He regularly goes into the same area. That's correct.

Mr. Harvey. OK.

Mr. Ritter. I have some additional comments on this, relative to wildlife, and in one case to a vegetative community. The wildlife discussion here that we—one of the aspects of it that bears attention is a rare color phase of the black bear known as the glacier bear or blue bear, which is located within this area, and the protection of that bear would be enhanced through this proposal. The beach strip, which extends from Dry Bay, southward, is an important habitat to wildlife and the inclusion of that area would enhance the protection of the wildlife that are moving on south and using the remaining part of the monument. Because of this refuge, as it may be termed, or a portion within the area that was not glaciated, the deception Hills area that I mentioned, the only place in this section of Alaska that has not been glaciated, there is an extremely unusual biologic relationship that centers primarily upon plant species. This area provides an opportunity to contrast the changes that have occurred here with the changes, the very dynamic changes which were occurring within the existing area, as the glaciers have rapidly receded. Recession of glaciers within the existing portion of Glacier Bay has been 60 miles over a period of 200 years, probably the fastest of any published.

Mr. Gordon. The one chief wildlife resource in this area is that the Alsek River, being the only low elevation course through the coast range for hundreds of miles, or nearly 100 miles in either direction, has been a major source of migration of bird, fish and mammal life. The moose that populate the Yakutat region came through that gap at a time when glaciers, unlike the present, did not block access. Every spring and fall, there is a major bird migration of very impressive scale. Cranes, swans, snow geese, particularly. I've seen large flocks even of owls that migrate through that valley between the interior of northwestern Canada and Alaska, so this is a major migratory habitat.

Mr. Jensen. Mr. Chairman, I've been 50 years in Alaska and spent 35 years guiding, and from my experience, most of the glacier bear that I know about, and they're very limited, that have been taken, have been at the head of Yakutat Bay up in Russell Fiord area and I just wanted to make that clear.

Mr. Hall. Mr. Chairman?

Mr. Quarles. Yes.

Mr. Hall. My name is Bill Hall. I've been requested by the United Fishermen of Alaska to represent them here. I am from the Cordova or Prince William Sound area, so I have no personal or specific knowledge about the resource potential of this area, however, I will be submitting to the committee a study that was done at the request of the Southern/Southeastern Regional Aquaculture

Corporation and the Northern/Southeastern Aquaculture Corporation in which they identified those areas that had a great potential for salmon aquaculture development, whether that development be in the form of fish hatcheries or in the form of natural stream rehabilitation, such as fish ladders. The general concerns of the United Fishermen of Alaska are that the habitat of the wild stocks be protected and access be maintained to it for proper management. Our specific concern is that those sites that offer potential for aquaculture development, which in some cases will require some form of actual installation, that provisions be maintained so that these sites are maintained available for development, whether it be by the Alaska Department of Fish and Game or by the nonprofit Regional Aquaculture Associations in Alaska.

Mr. HARVEY. Does your statement that you intend to submit identify those sites?

Mr. HALL. I don't have it with me. It was supposed to have been sent to me through the mail.

Mr. HARVEY. But I mean, it will identify them, so that we have more than just a general statement?

Mr. HALL. The study is specific and it was done at great expense to the private sector and the State of Alaska should have done it in the first place, but I will bring it here and give it to you.

Mr. HARVEY. Thank you.

Renewable Resources

Mr. QUARLES. If we could, I'd like to move on to renewable resources, again reminding you that it's both agriculture and timber. I would suspect that the Forest Service would want to lead off.

Mr. BEHNERT. The data that we have on the Forest Service portion of that area indicates that there are approximately 23,000 acres of commercial forest land within that area.

Mr. QUARLES. What area are you speaking of again? All of the additions?

Mr. BEHNERT. No, this is just the Forest Service portion of the proposed addition to the monument. This is the only one we have inventoried at this time, given the lack of transfer of these lands. These contain approximately 70 million board feet of timber, mostly hard wood, black cottonwood, to be specific.

Mr. GORDON. According to a printout that was prepared by the Park Service that comes from Dave Hansen's computer printout, the amount of forest land which is in the upper top 30 percent of the State percentile is 0.005 percent of the State. That amounts to 49.3 thousand acres in the entire addition.

Mr. QUARLES. What do the State's printouts say as far as forests?

Mr. WALDROP. Bob Waldrop, State of Alaska. That was extracted from a specific assignment that we did at one point in time. We haven't broken the computer out to reflect the various proposals that we're discussing here. I have it available for the whole southeast area and we can make it available in short order, just by getting on the computer.

Mr. QUARLES. These are the only additions, however, to existing units in the——

Mr. WALDROP. That's right, but we haven't broken it out by that. We have it for the whole southeast area and we can prepare it just by asking the right questions of the computer for any wilderness proposal or addition.

State and Native Land Selections

Mr. QUARLES. The next issue concerning these additions to the forest and monument is the land selection question, whether the State or the Native corporations have land selections which might conflict with any of the (d)(2) lands proposals.

Mr. WALDROP. The State has no land selections.

Mr. QUARLES. The regional corporation is here. Yes?

Mr. ALLINGTON. Yes. Roger Allington of Sealaska. The proposed forest additions will not have an effect, though I believe that the Glacier Bay National Monument addition would have. The proposed Situk River scenic river would have an impact on Sealaska selections in that area, as well as possibly the Yat-tat-waan, the village corporation of Yakutat. There's presently a suggestion to arrange a trade pursuant to the Alaska Native Claims Settlement Act so that there would not be a conflict between the Situk River proposal and Sealaska selections, but that's dependent on a number of things, including how much total commercial timber the Forest Service will have available in southeast Alaska, based on the various proposals that come up.

Mr. WALDROP. I might speak just a little bit on that. You may recall, in the Alaska Native Claims Omnibus Amendments Act there was a provision for Sealaska to select from the various areas outside the withdrawal on their 14(h)(8) entitlement. The State maintained the authority to approve or disapprove of their selections in several areas, one of which was this Yakutat Forelands area. We've reviewed the area and their tentative identification areas which they might like to select and it was our feeling that that area should remain in public ownership and we, therefore, did not approve of their selection in the Yakutat Forelands area, Situk River area specifically, as we thought the fish and wildlife values there were sufficiently high to be better off in public ownership, and then we helped them through this additional language which would provide for a trade, if it could be worked out. I think Roger might want to go on with that.

Mr. ALLINGTON. The State agreed to the filing of the application, but not to the conveyance basically to meet the deadlines that were imposed. But the specific problem that faces Sealaska in southeastern Alaska is we have approximately a 280,000 acre entitlement and so far including the Yakutat area, which is the area which is subject to discussion, there's only 250,000 acres of viable commercial timber lands available. Consequently, the State, working with Sealaska, agreed to this submission of a proposal, hoping that Sealaska, working with the Forest Service, could work out a trade so that the Situk River drainage would remain in public ownership, but Sealaska would be able to fulfill its entitlement under the Alaska Native Claims Settlement Act. My point earlier was that we are beginning to become a little bit concerned about the quantity of commercial forest that will be left in the Tongass, depending on what proposals are enacted, and recognize that the Forest Service may have a problem which then carries over to a problem for us if there's insufficient commercial forest available for trade.

Mr. JOHNSON. Mr. Chairman?

Mr. QUARLES. Yes.

Mr. JOHNSON. My name is Billy B. Johnson. I'm the chairman of the Lands Committee for the 13th Regional Corporation. The 13th region consisting of nonresident Alaska Natives, were not given any land when the act was signed. We are conducting a vigorous drive to obtain land in Alaska for the 13th Regional Corporation. Within 2 weeks, I will be in Washington, D.C., to schedule hearings on the amendment—single-purpose amendment to the Alaska Native Claims Settlement Act. I have the draft bill here and all the supporting documents to it, and I would like to give them to you for the record.

Energy Resources

Mr. QUARLES. The next topic is the energy resources.

Mr. WILSON. I'll speak to that. My name is Tom Wilson, representing the Alaska Oil and Gas Association. I think I might comment that the coastal lowlands area of the proposed addition would include the southeast edge of the Gulf of Alaska sedimentary basin, the northern portion of which is now being explored on the offshore by the oil industry. Two wells have been drilled in the lowlands there near the mouth of the Alsek River, to depths in an excess of 5,000 feet. There are sediments described by USGS literature in the Lituya District, which extends from that area in between the Alsek River and that point, with an excess of 5,000 feet of sediment. The offshore exploration could eventually extend into this offshore area, into the area offshore from this coastal lowland and, of course, siting for onshore facilities may be a matter to consider, or transportation routes, for instance, through the Alsek River, through into Canada, with any success in offshore exploration in this part of the area.

Mr. QUARLES. Yes.

Mr. GORDON. The State computer printout again indicates for oil and gas, the percent of total in the State that the State considered was potential in this Alsek proposed addition to Glacier Bay is 0.09 percent. Of that, the portion in the top 30 percent is zero. I would be very interested in knowing if you can tell us what, if anything, has been found from these drillings?

Mr. WILSON. Well, the sedimentary section that's been encountered is, say, over 5,000 feet of section in the two wells that were drilled in the lowlands in the Alsek River area, for prospective fishery sediments. They were, of course, dry holes. There has been reported an oil seep in the outcrop area in the Lituya or in the Topsi Creek area, rather, which is just south of Lituya Bay.

Mr. QUARLES. Anyone else wish to speak?

Mr. PITTMAN. Tom Pittman, Bureau of Mines. Sedimentary uranium potential is recognized in this same sedimentary basin.

Mr. HARVEY. Does that include, Mr. Pittman, lands that are proposed to be added to Glacier Bay?

Mr. PITTMAN. Yes, that basin borders and comes on to the coast in both the Forest Service proposed Alsek Forest addition and along the proposed Glacier Bay addition.

Nonfuel Mineral Resources

Mr. QUARLES. OK. Next is nonfuel mineral resources. Chuck.

Mr. HAWLEY. Chuck Hawley. Mount Fairweather, itself, is partly underlain by the copper and nickel bearing gabbro, and the existing National Monument is partly in the Alsek extension. There is some potential for beach placers along the coast, and is it appropriate to also comment about Glacier Bay at this time?

Mr. QUARLES. Sure.

Mr. HAWLEY. OK. Well, we understood that in the legislation that passed a couple of years ago that the Secretary could make recommendations concerning the extent of wilderness area. The main deposit that's known as the Brady Blacier copper/nickel deposit, which is proven of about 100 million tons, probably 300 million tons of material, that is, equivalent to about 1.5 percent copper or slightly better. At least at the time the bill passed in Congress, there was a question about whether that would be a proposed wilderness area. The other copper/nickel deposit that's comparable in size is the one in the Boundary Waters Canoe Area.

Mr. SILVER. What kind of mineral values are there in the vicinity of the Alsek River.

Mr. HAWLEY. It's just not very well known. As you get up towards the Yakutat Forelands, the Yakutat Bay Area, the work by the Geological Survey indicates fairly low mineral potential. The mineral belt that extends from Brady Glacier through Mount Fairweather would continue into the Alsek country, but it's just so rugged that there has been very minimal exploration in the area.

Mr. QUARLES. Anyone else wish to comment on the nonfuel mineral resources?

Mr. PITTMAN. Yes. In the Juneau Ice Field area the Geological Survey in a short paper published several years ago, indicated some higher than normal values in, I believe, antimony, lead, zinc and some silver near the south end of the ice field area. In the Kates Needle area, work in the Tracy Arm-Fords Terror Wilderness Study area showed anomalous values in bismuth in the southern portion of the study area. There were other scattered anomalous values farther north. Several miles south of the Wilderness Study area, about 2 years ago a molybdenum or a molybdenite occurrence was discovered by a company geologist. He considered it of enough significance that they intend to go back in, if the land management status for that area allows them to go ahead with prospecting work.

Mr. QUARLES. Yes.

Mr. BERG. I'm Hank Berg, U.S. Geological Survey. The Geological Survey's level 2 studies of southeastern Alaska are barely underway, but we do have—we have completed a statewide level 1 study and we do have some level 3 information from recent mapping investigations in Glacier Bay and the nearby areas. I tried to summarize the information that we have for a preliminary level 2 assessment, and all we have now is information that suggests that on geologic grounds, which incorporates bedrock geologic mapping plus information on the known mineral deposits, in the area that I understand in Glacier Bay, geologic conditions are favorable for the occurrence of three types of mineral deposits. One would contain a molybdenum in igneous rock. A second type would contain a variety of base and precious metals in volcanic and volcanic related rock, and a third would contain copper and nickel and possibly platinum by-products in the gabbrol. Our studies, I say, are related to the regional distribution of the geologic terrain. In the Juneau Ice Field addition, similar studies suggest that there is a potential for molybdenum, again in igneous rock, possibly with by-product uranium. That pretty much concludes my statement at this time.

Mr. GORDON. This is just referring again to the addition to Glacier Bay, just to clarify, that the State computer printout indicates 215,000 acres that have some degree of mineral potential. The amount which is in the top 20 percentile is zero.

Mr. QUARLES. Yes.

Mr. HAWLEY. I have to comment on the State's computer program. The information in general is very good. I think when you look at it as a statistical summary and so, in a broad brush, when you say the top 10 percentile, why, it's going to look very good. But when you come down to a quite specific situation, their information is not going to be very good, for one thing, because it was generated generally from very preliminary information. It was generated from E scale maps, one to two and a half million, and so when you come back and want to apply that quite specific information in any one area, you're going to be in a little bit of trouble. So I think as a general guide, it's very good, but when you get quite specific, there are problems with that information.

Transportation and Access

Mr. QUARLES. Good. Then the last topic for this area is the transportation aspect and, of course, it's already been touched on in terms of discussion about offshore oil and gas. Anybody, in general, want to discuss this issue any further? Yes, sir.

Mr. HUGHES. Andy Hughes, Alaska Department of Transportation and Public Facilities, and State project manager for the Southeastern Alaska Transportation Study. We've held, in conjunction with the transportation study that's underway, two series of public workshops there at southeastern Alaska, including Yakutat. Yakutat has, at the two different series of workshops, indicated or suggested some interest in the Alsek River Corridor, that is, the corridor offering the only access, as it does, for animals, for use by man in the way of transportation access, and also it was suggested that the corridor should be considered for potential use as a pipeline corridor. If gas reserves of sufficient magnitude were located in the Yakutat area, it would provide the capability of running a pipeline up the river valley to the same pipeline corridor and up to the new or the proposed Alcan Gas Pipeline. As I say, there was some interest indicated in this river corridor as a transportation corridor. The residents of Yakutat indicated that their primary interest was in water transportation and particularly freight transportation, waterborne freight transportation to the communities. The study is currently evaluating the Alsek Corridor and the results of the study won't be out for several months. That's all I have to say for that.

Mr. HESSION. Mr. Chairman?

Mr. QUARLES. Yes.

Mr. HESSION. Jack Hession, Alaska Coalition. This probably comes under the heading of transportation as well, but the Alsek River is becoming the major recreational resource. I know of three river trips this summer alone by commerical outfitters and it's a very popular run among recreational boaters in the State. I regret I don't have personal experience here but I would guess that it's one of the premiere white water rivers in the State, particularly on the Tatshenshini. The Alsek, itself, is apparently now blocked off at Tweedsmuir Glacier, but the Tatshenshini offers a lengthy river trip through one of the coastal ranges and that is not common among the rivers of Alaska.

Mr. GORDON. Let me make a clarification here. The Tweedsmuir Glacier is in British Columbia. The Tatshenshini runs into the Alsek in British Columbia below that glacier and then flows into the United States.

Mr. HAWLEY. We would have concern with the possible use of the Alsek as a transportation corridor. I think it should be recognized that that's a route used by bush pilots going from the coast to the Whitehorse area, and that there might be consideration of bush airstrips along that corridor. It's the only low level pass that you can go through until you get down in the Haines area and come back up that way.

Mr. QUARLES. Hopefully, having concluded this area, the next area is the Admiralty Island and again we start off with scenic, landscape, historic, and archeological values.

ADMIRALTY ISLAND

Scenic, Landscape, Historic, and Archeological Values

Mr. GORDON. The Forest Service should lead off as they've done a very outstanding resource analysis here. I'll simply give the scenic complex identified on the scenic map and then turn it over to Carl Lane, who has guided in that area for many, many years and he can explain it more thoroughly.

Two resources. No. 1, for some portion of the Juneau metropolitan area, a lone pyramid-shaped peak, Eagle Peak, is a dominant viewpoint from the skyline, along the foreground is Eagle Peak, which is from Young's-Bay. This is in the north—How do I describe it? It's the northeastern shoreline of Admiralty Island so, of course, the people living in Juneau are concerned with protecting that foreground.

The major identified visual unit on the island is a series of lakes, a small river, and a very complex inlet to the sea, which together comprise a water route diagonally from east to west across the center of the island. It's called the Hasselborg New Trail, if you want to call it that. The visual character is gently rolling hills, which are rather unusual on the islands of southeast Alaska, with higher mountains both to the north and the south, and the lakes are fairly small. They have beaches, they have a variety of open meadows and very dense forests for visual variety. Perhaps the most notable visual experience in the whole traverse is the Kootznahoo Inlet, which is primarily in the lands selected by the Natives, which they want to protect. It is probably the most complex series of winding, narrow, saltwater channels and inlets, corkscrew little holes and bays in all of southeastern Alaska, as well as being probably the richest marine shallow water resource production area in southeast Alaska. The visual character is such that you feel like you're going through a very trailing stream, with rock bluffs on both sides of you. It's private land, but it's bedrock and there are low rock bluffs that stick out, so from a visual point of view, this area probably is not duplicated in southeast Alaska. I'll turn it over to Carl Lane now.

Mr. LANE. My name is Carl Lane. I'm with the Alaska Coalition. I'm a full-time working guide, have been for over 28 years. I've been an Alaska resident for 32 years. Dick really covered the scenic spots. He kind of shot down my—I've got a little tour I make around there every summer. Mainly, in the early spring, I use it for a brown bear hunting area. It's the last undeveloped island we have in Southeastern Island that hasn't been heavily logged, and there's been a little logging on it. Whitewater Bay was pretty well cleaned out, besides the harbor was logged. I cut 3 million feet in Loweskey myself about 25 years ago. There's been a little bit of logging in Seymour Canal, but it is the last really untouched large island we have in Southeastern. It's also the island that has the largest concentration around there and it's slowly going down, as they are on all the other islands, but it has from the area in the middle of the island, on the west side, south of Point Gardner, it has the highest concentration of bald eagle in the world. Now, there's a little controversy whether it's over on Tiedeman Island or if it's on this area, but it's almost solid nests. There's over two nests for every 3 miles. It's one nest right after another. Now, some of these nests aren't used every year, but you can see nest after nest after nest going down the island.

It has a great concentration of deer, because we don't have any wolves on the island. Wolves have got our deer and goat populations knocked down, because we've got a high in wolves and low in goats and deer on some of the southern islands. The only thing that affects the deer population on Admiralty is very hard winters. The hunter take is very nominal, because we don't have that many hunters yet in Southeastern.

It's an ideal island to take summer cruising trips on, because you can show people practically everything we have in Southeastern, except mountain goats. In the Koowotsnawoo/Angoon area is a great trout fishing and a great king salmon spot. In fact, the world's record king salmon of 93 pounds was taken just across, within about 8 miles of this area last summer.

There's one bay after another that are absolute jewels, like Chaik Bay, just south about 15 miles from Angoon. It's a great trout stream, mostly dolly varden, king salmon. It takes about a week of slow travel to go around the island. It's about a hundred miles long from the end of Mansfield Peninsula to Point Gardner, and it's our main summer junket. We go around the island and we go up in a Seymour Canal into a Forest Service area, a bear reserve called Pack Creek. An old prospector lives there that has taken care of the bears for years, and we have shown many people 20 and 30 brown bear at a time there on Pack Creek, fishing for salmon in the summertime.

I could go on mile after mile, beach after beach, I've seal hunted clear around the island in former days. I've cut timber on the island. I've guided for almost 30 years on the island. I've crisscrossed the island. I have a camp in the center of the island in a barrow, yet. I even own a little land on the island and I am some day going to retire there, if I ever live that long. I'd be very glad to answer any questions specifically on that one. I probably know Admiralty better than the other island, although I hunt Chichagof and Baranof. I used to hunt—when we first started, we started at Ketchikan and hunted clear to Juneau. We would turn around at Juneau and pick up trips and hunt back to Ketchikan. We now have a large pulp timber industry. A lot of the bays where we hunted have small towns in them now, with schools and churches. Most of the hunting country we had 25 years ago is now gone. I would make a rough guess that we are hunting today in less than one-third what we were hunting in 25 years ago, and it is increasingly getting smaller. As the clear cuts are beginning to be made smaller, it takes more roading to reach more timber and as you open up the country, wilderness animals, they don't put up with roads and trucks and Caterpillar tractors.

Mr. QUARLES. Again, we turn to the Forest Service.

Mr. BEHNERT. The points that have been made with regard to the beaches of Admiralty are known by many. It is recognized as a major intact ecosystem, primitive in its qualities. It is recognized as the area that has possibly the most concentrated population of nesting eagles in the continental United States. In the United States, in total, I should say, North America. Resident salmon species, all five of them, and cutthroat trout, dolly varden, and halibut. It's an immensely rich island with respect to its pristine values. It is also known to contain dense stands of Sitka spruce and associated species.

Admiralty as a land mass in Southeast has many, many values. We have endeavored to look at the island with respect to its constituent parts, and in our planning effort, we have basically subdivided the total forest into approximately 870 analysis units. Admiralty is broken into approximately 50, and again as we look at this definitive composite which I've posted on the wall, you can see how some of the values of Admiralty are portrayed. There is a divergence. It is not uniformly high quality with respect to those particulars, but it does contain many, many areas that are of unique and superlative value. From a recreation use standpoint, it has received heavy emphasis from the city of Juneau, and also lesser pressure from the city of Petersburg, which is to the south of it, and some from the villages of Angoon and Hoonah, which are over on the Chichagof Island.

The island itself, with respect to land-type composition, is about 18 percent alpine, and that is predominantly centered in the north central portion of the island where there is a large rift of mountains. These are often considered superlative in the visual sense. Predominantly, the island is vegetated and in our analysis, contains approximately 50 percent, as I recall, glacial valley walls, with about 50 percent in valley bottom lowlands. Then minor portions that are in estuarine and about 8 percent and what is called muskeg.

I read from a set of factsheets that we have compiled for each of these areas that are on this map, particular reference to Admiralty in this case, and we'll be happy to convey this fact sheet to the committee at a later point. You can read for yourself what the total set of values that we have assessed are.

Mr. JENSEN. Mr. Chairman, I'd like Mr. Boddy to speak on this, representing the Alaska Professional Hunters Association on Admiralty for many, many years.

Mr. BODDY. Mr. A. W. Boddy. Thank you, Mark, and ladies and gentlemen, members of the committee. I've lived in southeastern Alaska for 37 years. My home has been in Juneau, and I've had an opportunity to travel over Admiralty Island, the best portion of it, by foot, into the waters of it by boat, and over it by air, both helicopter and conventional aircraft, on many occasions, not just for sporting, but also in rescue operations, things related to the savings of lives. I don't think there's any more area in the United States that's more controversial and more cussed and discussed than Admiralty Island. The discussions began before I came to Alaska and that's quite some time ago, but I am familiar with Admiralty Island. I think we compare it sometimes as being—in superlative language, but I'm familiar with the rest of southeastern Alaska as well and I would like to have all of you take a good look at Chichagof Island, Baranof Island and many of the others. We're very proud of them.

But, getting back to Admiralty Island, I think it has a lot of values and a lot of those have been expounded upon, but we do have high wildlife values. We have extremely high recreational values and opportunities. I've had the pleasure of working with the Forest Service, the U.S. Fish and Wildlife Service in the State of Alaska, in helping to develop a facility that would afford the family-type recreation. I think that it's very important. Over the period of years, we've developed a series of cabins and shelters in the Admiralty Lake area, and other areas of Admiralty Island, as well as some on Chichagof Island. These are extensively used. The records which we can provide you of an exact copy of the use of those areas, not only by Alaskans, but by non-resident visitors, is extensively high and it's increasing every year.

Recently, we met with the Forest Service to discuss our cooperative agreement. We found that we already have a goodly portion of the cabins that are available already reserved for 1978. In fact, we have little time working in the places where we can get in to do the maintenance work and things of that nature. So I think its something that has a terrific recreational value, not only for the hunters and the fishermen and things like that, but it also has a lot of other values, just for sightseeing and things and photographs and things that are important to an awful lot of other people.

We have been in a position of studying Admiralty Island, as an organization, the Juneau Sportsmen, which I represent, along with the Alaska Wildlife Federation, for over 30 years, we've had the opportunity of having some extensive studies made by residents of the area in connection with specialists in the Forest Service and Fish and Game, and so forth, but we feel that we have a pretty fair knowledge of what Admiralty Island is and what it has to offer. We feel that there are equal opportunities for all types of recreation, both the backpacker, that is, the wilderness segments we've recognized and recommended two areas of wilderness. We've recommended the Admiralty Lakes area and other areas as National Recreation areas. We've recommended certain areas that are high and rich in timber. This is real important not only to the timber companies, but some of those areas which are in dispute now are extremely important to the economy, the Native people of Juneau and Sitka, and we support their claims to select land on Admiralty Island. We have supported that and we continue to support it. So I want to make it real clear that we're not in any way saying that Admiralty Island should be all put into one category. What we're saying is, let's take a look at it and divide it up to the best advantage and the best—most benefit to all of the people. And I hope that this will supply you with a good deal more information.

Could I make an observation on the West Chichagofs while I'm here?

Mr. QUARLES. Yes, go ahead.

Mr. BODDY. West Chichagof is an area which we've also been involved with for a good many years. We've worked with the Forest Service, we've worked with a lot of people, trying to arrive at some type of a management plan for that island. After several attempts and several false starts, the Forest Service did come up with a recommendation which we concurred with, because we felt that it again came back to a situation where we could recognize the highest value and that was the outer islands and the various shores that border onto the ocean of Western Chichagof and Yakobi. Unfortunately, that has not been accomplished. It is all back into a wilderness proposal now, which we object to, and we feel that this is again an opportunity for reasonable people to get together and discuss some of these things and come out with some real good compromises, because I don't think we're going to get anywhere if we're throwing bricks at each other. We do have a lot of information on this and again I would like to submit this that we have for the Jericho Sportsmen and the Alaska Wildlife Federation. If there are any questions, I'd be glad to answer them.

Mr. QUARLES. Thank you. Does anyone else wish to comment in general concerning the scenic, landscape, archeological, and historic values? Yes?

Mr. NEWMAN. Yes. I would like to comment on the last item in that list. My name is Stelle Newman, anthropologist, National Park Service. I was fortunate enough to spend some time in Angoon, talking with the people there, and since this hasn't been really adequately discussed, I'd like to give you some thoughts about the people of Angoon in terms of their own perspectives. They're Tlingit Indians and have a long history on Admiralty, having, according to their oral history, migrated down the Stikine out of the interior and over a period of time and a series of many adventures, ended up in Admiralty. This long history is recorded both in legends and in archeology. There are a number of archeological sites in the vicinity of Angoon, Chaik Bay, Whitewater Bay, and a number of the other bays and inlets. They have an exceedingly complex social organization and I won't attempt to go into it here, but suffice it to say that certain groupings within the Tlingit group living in Angoon have long associations with particular geographical areas around the island, particularly the southwestern side of the island. They have had a long association with the sea and this long association with the sea has continued until the present time. Today, the people there are commercial fishermen and they still continue their subsistence activities, associated both with the sea and with the near coastlines, strictly deer hunting.

Today, if you visit there, you will find tribal houses still being maintained. You will find their traditional paths, very elaborate and very valuable to them. Traditional dances, songs, and they'll talk your ear off with oral history, giving their own views about Admiralty and the legends about their movement out of the interior. They're very anxious to preserve their cultural heritage and they're doing an excellent job in doing so.

Wildlife and Fish Resources and Uses

Mr. QUARLES. Thank you. Next is wildlife and fish resources. Who would like to speak to that first?

Mr. MERRIAM. Mr. Chairman, Harry Merriam, Department of Fish and Game. I can only reinforce what has already been said concerning wildlife and to consider the wildlife, extremely important on Admiralty Island. Excellent deer population, good waterfowl population, good fur population, but Admiralty has always been known for its brown bear population, particularly southern Admiralty, which has historically had some of the highest brown bear populations in southeast Alaska. It has attracted hunters from throughout the world and Admiralty is an extremely important area to wildlife. Mr. Armstrong, would you speak on fishing?

Mr. JENSEN. Just another comment on brown bear. I've probably guided for brown bear along with Carl over here for over 30 years, each one of us, and my experience has been this, and that is that brown bear should be harvested for the simple reason that if you don't harvest brown bear, pretty soon you have the big boars causing a high mortality rate among the smaller bear, and from the standpoint of the animal, itself, you have a much stabler population and a healthier population, in my opinion, if there is a certain amount of harvest on a yearly scale. That's my observation.

Mr. ARMSTRONG. I'm Bob Armstrong with the Fish and Game Department. Admiralty Island is probably one of the most important land masses in southeastern Alaska for fisheries. We have 83 areas in southeastern Alaska that our Department has identified as top quality sport fishing areas. Admiralty Island contains 13 percent of these. Of these, two of the particular waters, Kanalku Lake and Admiralty Lake, were recommended by the Department in 1972 to the Forest Service for wilderness studies. There are several systems with the escapements of over 500 coho. There are four systems on Admiralty Island that for many years have pink salmon escapements of over 50,000 each. Of the top quality cutthroat systems in southeastern Alaska, Admiralty Island has about 20 percent of them, and it has one very unique system, the only island run of chinook salmon that occurs in southeastern Alaska. That's it for fisheries.

Mr. BEHNERT. Rai Behnert from the Forest Service. I'd like to add a few things to that. The estimated escapement of salmon for the island in a collective sense, by our reports, is approximately 10 million for the five species of salmon, including coho, sockeye, chum, pink, and king. For trout and char species, the escapement is approximated at about 150,000. Admiralty is considered in the Chatham area, the administrative area that occupies the northernmost portions of the Tongass National Forest, is the higher ranked island of the prospective fisheries.

Mr. MERRIAM. Mr. Chairman, Larry Merriam, Fish and Game again. I neglected to mention that Admiralty Island probably has the highest use by the public of any area in southeast Alaska.

Mr. QUARLES. What kind of use? Do you mean hunting use? Hunting and fishing?

Mr. MERRIAM. High recreational use for hunting and fishing.

Mr. LANE. Carl Lane again. I'd just like to mention, brown bears are not like black bears. Black bears adapt themselves very nicely to human beings. There are a lot of black bear back in Wisconsin and Michigan. I believe if those were brown bears instead of black bears back there originally, they would be extinct. Now, you can't cut an island up like Admiralty with roads and give somebody what they want here and somebody what they want there, and have it a criss-crossed patchwork of roads and expect to have a wilderness animal live there. They just don't work that way. The grizzlies in the West didn't live that way and survive, and the bears in this country won't survive that way either. I don't think they will. One-half of the total take of the brown bears 2 years ago in 1977 was from the lower half of Admiralty Island, and that's a lot of bears.

Renewable Resources

Mr. QUARLES. The next issue to be discussed is renewable resources, timber, and agriculture.

Mr. QUARLES. We can start with the Forest Service, if you like.

Mr. BEHNERT. With respect to timber resources on the island, the data that we have compiled indicates that more than 60 percent of the island can be considered commercial forest land, approximately 628,000 acres would fall into this classification, the rest being noncommercial forest or nonforested. The annual potential yield that has been estimated for the island with respect to those acres is in the range of 115 to 125 million board feet per year. In addition, the classification of operability, which relates to the economics, access, and wherewithal for actually harvesting of timber is very high. Approximately 71 percent of the island falls into a category of normal, which indicates that standard logging techniques could be employed with only 7 to 8 percent called inoperable. The other percentile—29 percent—would be harvested, although with non-standard techniques. Again, as a point I made before, the island is valuable in many respects and this is also true for the timber resources. In looking at the map that relates to this particular point, you can see that in looking at this timber quality supply that the values range higher toward the bottom end of the particular scale and that the red and orange and yellow areas tend to be the ones that are higher ranked with respect to the timber resource, itself. When you look throughout the southeast, you can see where these values are centered for this analysis. The same kind of scale relation was made for the mineral deposits and it would be useful to the committee to gain an appreciation of how these areas that we're talking about accomplish some of the values that are being considered.

Mr. QUARLES. Anyone else wish to address the timber?

Mr. HARVEY. Mr. Behnert, are there any timber sale contracts presently outstanding on the Admiralty Island?

Mr. BEHNERT. No, sir, none. The area was once considered for inclusion in the Juneau unit sale. It is included in the working circles and in calculations for existing plans.

Mr. HARVEY. It's not included in the allowable cut now, anyway.

Mr. BEHNERT. It would be in the sense of the total sustained yield for the forest, yes, but it is not planned for in regard to any tentative sales.

Mr. HARVEY. OK. But if so, if the timber, by law, could not be cut, then you would reduce the sustained yield and the allowable cut in the Tongass?

Mr. BEHNERT. That's true. That's true, except that that has not become law.

Mr. HARVEY. I understand.

Mr. BEHNERT. It is included at the moment in the total sustained yield calculations. That acreage is part of the total acreage.

Mr. IMESON. And what would the reduction be if it were put into a system where it couldn't be cut?

Mr. BEHNERT. The figure I cited was 115 to 125 million board feet per year.

Mr. IMESON. What kinds of trees are you talking about?

Mr. BEHNERT. Sitka spruce, western hemlock.

Mr. HARVEY. What percentage is that of the Tongass?

Mr. BEHNERT. In total?

Mr. HARVEY. In total, in terms of your cuttings per year?

Mr. BEHNERT. In terms of total potential yield, approximately 10 percent.

Mr. SILVER. What percent of standard timber as well, as opposed to especially marginal?

Mr. BEHNERT. I can't give you that figure at the moment. I haven't broken that down. There are components involved in these particular figures here, but we would have to relate to the total. In other words, that 115 to 125 million board feet is constituted of acres that are classified standard, as well as marginal.

Mr. SILVER. Do you know how many board feet are in the Native urban corporations—Shee Atika and Gold Belt—withdrawal areas?

Mr. BEHNERT. We have compiled information for each of the units that you see on the map behind you, that could approximate those particular selection areas. We have now undertaken a further analysis in respect to those selections. We don't have that data at the moment.

Mr. SILVER. The rest of my question, I was going to follow it up, if you have it, what—how many board feet would have to come out of some other forest service annual allowable cut area if the Native Urban Corporation entitlements are not taken from Admiralty, but are taken from someplace else? Is there some way to work that up eventually, do you think?

Mr. BEHNERT. We could work that up for the committee.

Mr. SILVER. Thank you.

Mr. QUARLES. Does anyone else wish to speak to the—yes.

Mr. HAWK. Mr. Chairman, my name is Ron Hawk, representing the Alaska Coalition. I just wanted to ask Rai, what percentage of the commercial forest land right now is within the allowable cut figures?

Mr. BEHNERT. As we look at the total commercial forest land base, which is comprised of approximately 6 million acres, the potential annual yield is calculated on the total. From that point, reductions are made for the various components, like the unregulated, which constitutes lands that cannot be harvested for one reason or the other, as well as acreages that are proposed for State and Native selections, and areas that are included in (d)(2) proposals or study areas that we have designated in the past. The total percentage that the yield is calculated on now relates to all the acreage, with those exceptions, and until there is a reallocation which we are, basically, to finalize by approximately June, we will not know exactly what percent of that total base of commercial forest land will be within the allowable cut.

Mr. FINNEY. My name is Don Finney. I'm representing Alaska Logger's Association. Although it's very difficult for us in the timber industry to be quite specific about our resources, because as the Forest Service just testified, it's looked at as an allowable cut from the whole area, I think it might be a good time for us to give some statistics for the record, which put the present harvesting and manufacturing resources of the timber industry in southeastern Alaska in perspective. This is based on 1976 data. Employment figures for the industry are 4,050 direct employees. These employees contributed $72,221,000 annually directly in wages and payroll, wages, and salary. This amounts to 27 percent of the total employment, 30 percent of the total wages, and salaries of the southeast. Using a 34-percent factor developed by the Alaska State Department of Commerce and Economic Development, we would place the overall direct and indirect wages and salaries at $96,767,000 annually, and the average employment, 5,818 jobs currently. Gross sales of the timber products in southeastern Alaska at the present time average yearly somewhere around $200 million.

There are mills scattered through the whole of southeast Alaska. There are pulp mills, one located in the Ketchikan Area, owned and operated by Louisiana Pacific Corp., one in the Sitka Area, operated by Alaska Pulp. There are sawmills scattered throughout the area. Ketchikan has two sawmills. The village of Metlakatla and Annette Island has one sawmill, and the village of Klawock has a sawmill. There are two sawmills located in Wrangell, one in Petersburg, one in Haines and several other smaller mills throughout the area cutting local domestic-type wood. The logging is diversified and scattered throughout almost the whole Panhandle, with over 40 logging companies maintaining small towns and communities and moving their logs to the nearest markets.

We estimate that the total capacity of operations of established manufacturing facilities presently operating in southeast Alaska utilize in excess of 600 million board feet annually, and again I stress, that's the maximum amount, 600 million annually. Our testimony is that the average usage for the presently established timber industry in southeast Alaska is 510 million board feet. Obviously, you can't arrive at 510 million feet as an average without occasion of having a maximum and without occasion of having a minimum, so we want you to be aware that somewhere in the vicinity of 600 million must be the maximum figure for the present industry to sustain at this period of time.

It's the industry's testimony also that a reduction from all Withdrawals, Native, State, and Wilderness designations, would reduce the land base below 510 million board feet of average allowable cut, will result in the curtailment of present manufacturing potential of the timber industry in southeast Alaska and a subsequent loss of ongoing jobs. It is also our testimony that until there are changes in the economics of harvesting and marketing, this volume must come from the historic level of the three components for the allowable cut, which are standard, marginal, and special. Historically, the industry has only used 9.5 percent of the marginal and special cuts. We've historically used 90.5 percent of the standard cut, and what we're saying is that without a change in the economics or market situation in the immediate future, we don't see that the industry would be able to depart from that. Thank you.

Mr. IMESON. I wonder, does the State Department of Natural Resources have the figures on timber on Admiralty Island right now?

Mr. FINNEY. Unfortunately, we don't. As you're aware, the recommendation of Assistant Secretary of Agriculture Cutler was just made and we haven't had a chance to feed our computer the proper boundaries. As soon as we can get a good map, it's just a matter of feeding it into the computer. I can tell you what it is throughout southeast, but I can't pull it out for just Admiralty or any other particular proposal.

State and Native Land Selections

Mr. QUARLES. And the next topic, and one that was referred to in Steve Silver's question, is the land selection issue, the State and particularly the Native Urban Corps. on Admiralty Island. Who might wish to speak on that? Yes?

Mr. ALLINGTON. Roger Allington of Sealaska Corp. While we have no selections as such on Admiralty Island, due to legislation that was enacted in early 1976, I do think that from the Native standpoint it should support the position of Goldbelt, a corporation out of Juneau, and Shee Atika, the corporation out of Sitka, that made some of their selections, not all of them, from Admiralty Island.

I think that the committee has got to keep in mind that the developed bills, the impact that somebody mentioned earlier of what happens if these corporations are required to take their entitlements from some other location, that there's only so many board feet of timber in southeastern Alaska and when you start moving around groups and particularly on the basis that I've heard indicated, on the value for value basis, it's going to be a substantial impact on the allowable cut from the rest of the forests for the other contractual issues. I think that—well, I'll save that for later. There's some other things that we'd just as soon not get into until we're into the Sealaska Area, but Goldbelt and Shee Atika are very concerned about their selections on Admiralty Island and so far none of the proposals that have come out have been completely agreeable, as I undestand it, and one of the things that seems to be lacking is an understanding that Sealaska Corp. will own the subsurfaces estate on any lands conveyed to those two urban corporations, and consequently we do have a concern over what happens to the lands that are now identified for selection on Admiralty Island and may be moved somewhere else.

Mr. HARVEY. I think I understood what you said was that if the regional corporations or even the villages had to switch their selections around, that that would have an impact on the allowable cut in the national forests. Presumably, the lands that are now in the forest would be transferred into private ownership. That would not necessarily mean, though, or would it—did you mean to imply that that would reduce the total timber harvesting? All I'm suggesting is, that land, I assume, would still be probably as available for timber harvest in private ownership as it had been available in public ownership.

Mr. ALLINGTON. That's what I was going to wait until we got into Sealaska, but sine you've brought the question up, I'll answer it. I don't think anybody should assume——

Mr. HARVEY. I didn't say more or less, I am just asking.

Mr. ALLINGTON [continuing]. That the natives are going to cut their timber. I think that it's a misconception. I think that basically we're talking about it and we probably will, but to assume that this is going to happen could be erroneous. The other think is that I think that the Native corporations have felt that in getting their land, in getting the conveyance out of the national forest, I know we feel this way, that it's going to provide additional jobs. It isn't a question of just maintaining the existing jobs, but the only way that the Natives of Alaska are going to realize a major impact from the Alaska Native Claims Settlement Act is through the creation of new jobs by the land base and the capital base that was provided under the Alaska Native Claims Settlement Act. So to say that the

Alaska Native timber in southeastern will provide a timber base for existing industry tends to short circuit the hopes of the people that were hoping to provide additional jobs, that if there are 5,000 jobs in southeastern right now that are supported by the timber industry, hopefully, those will continue and the Native timber would supply a certain percentage more than that, so as to provide a job opportunity for Southeastern Alaska.

Mr. SILVER. Roger, if the Native timber is cut, do you anticipate that the timber will be processed or exported in the round?

Mr. ALLINGTON. It depends on the economy at the time. I think that you should realize, the Forest Service or Mr. Finney can tell you this better than I can, but there's only something like 15 percent of the timber logged that is really suitable for exporting in the round and if you export those without something to do with the remaining ones, you're left hanging with an uneconomical product. So you've got to treat the whole thing as a whole and, very frankly, we are looking into markets right now for Sealaska, and I know the villages are looking on their own. There's no set market at the present time. The market could possibly be a southeastern market or it may not.

Mr. HAWK. Mr. Chairman, Ron Hawk. I just wanted to comment on the job figures that have been mentioned and were provided by the industry. There's no question that the timber industry is a significant factor in the economy of Southeast. The Department of Labor data that I got just a couple of weeks ago shows that logging, lumber and pulp jobs in Southeast for August of 1976, which was the highest month, were 3,300 and the lowest month was January, at 1,835. I don't know where the 5,000 figure comes from. I know that George Rogers is looking very closely through his economic study at all of those to determine exactly how many jobs are provided to Alaskans from this industry and how many jobs are provided to non-Alaskans. For instance, the State of Alaska, in 1976, paid a million dollars in unemployment checks, sent to people out-of-State, who had logging jobs within Alaska.

Mr. FINNEY. Mr. Chairman?

Mr. QUARLES. Yes.

Mr. FINNEY. Don Finney again, for the Alaska Logger's Association. One thing I forgot to mention is that the industry does have a position paper which would give the background for the job figures that we have and all of the necessary statistics and we would be very happy to submit that as part of the record.

Mr. BEHNERT. Rai Behnert here. On the point of the job issue, I would refer to the work of the University of Alaska and our own economist with respect to the numbers of jobs. Taking the 1970 to the 1976 average, the number of jobs that could be attributed to the timber industry in Southeast, both or primary and induced jobs, is roughly 6,500. That is the figure, and that constitutes approximately a third of the employment in the Region.

Mr. HARVEY. Since all these numbers are different, I gather that what we need is, in all seriousness, if for each one who's interested, that they do not only submit the numbers, but submit the assumptions or the way you achieved those numbers, because people differ in terms of their secondary employment percentages.

Mr. QUARLES. Yes.

Mr. WALDROP. That gets back to the land selection, land ownership question. The State of Alaska has just recently completed a rather intensive land selection program. It lasted about a year, maybe a little bit longer, and we have selected seven areas on Admiralty Island and they total about 3,800 acres all together.

Mr. QUARLES. Excuse me. Selected or identified for selection?

Mr. WALDROP. Selected. This has entitled the State to select up to 400,000 acres out of the existing National Forests.

Mr. HARVEY. OK. That's for community purposes only.

Mr. WALDROP. Yes.

Mr. HARVEY. 400,000 out of the national forests and 800,000 total, is what you mean?

Mr. WALDROP. Section 6(a), right.

Mr. HAWK. I would just like to comment on that, that the public was unaware of those particular selections until they were announced by the State, oh, about the first or second week of January. There was no public involvement, to my knowledge, on the Admiralty Island selections that the State did make.

Energy Resources

Mr. QUARLES. If we could, as we are falling way behind here, turn to energy values on Admiralty Island. Does anyone wish to speak to the energy values?

Mr. PITTMAN. There is a small coalfield with a little historic production, Koowootsnawoo coalfield, which lies east of the village of Angoon, extends a few miles to the north and several miles south. The coal is in rather thin beds and ranges from lignite to bituminous. The production potential is rated very low under present coal mining philosophy. But there are several conditions under which it could be valuable locally as an energy source. There are also resinous constituents of the coal that could be utilized by either a coal product or a product of primary production by the local people. There is another coal prospect at the south end of the island, Murder Cove. There was some underground development on this in the early days. The production potential was generally rated as minimal. There is another interesting connotation to that deposit. It marks about the northwest end of a now recognized sedimentary basin. The northern rim runs about from Eliza Harbor to Murder Cove. It has a possible potential for nonmarine type deposits of sedimentary uranium. This basin is presently mapped from the southeast tip of the island, Kuiu Island in the neighborhood of Saginaw Bay. That is about the only information that we have on energy potential.

Nonfuel Mineral Resources

Mr. QUARLES. All right. The next is nonfuel mineral values. Yes.

Mr. GLAVINOVICH. Mr. Chairman, my name is Paul Glavinovich, with the Alaska Miner's Association, and we would like to address the mineral potential of Admiralty Island and to do so, I'd like it to be presented by three individuals with personal knowledge of the island. They've all worked on the island and they will address some of the more recent finds of what we consider to be quite significant, and it is only recently that these finds have been made, and possibly a product of the dense cover on the island, as you've heard described, but also, I submit, it reflects the new techniques, our new technology of exploration.

Mr. BUTLER. Mr. Chairman, my name is Tom Butler. I'm assistant geologist for Noranda Exploration here in Anchorage, Alaska. Noranda Exploration has operated for the Pan Sound joint venture, has been conducting base metal mineral exploration in Southeast Alaska and on Admiralty Island since 1973. The Pan Sound joint venture is composed of four companies, Noranda Exploration, Marietta Resources International, Mitsubishi Corporation, and Texas Gas Exploration. To date, these companies have spent approximately $2.3 million on exploration in Southeast Alaska, $1.9 million of which was spent on Admiralty Island. These funds have paid for the staking of over a thousand claims, the analyzing of approximately 15,000 geochemical samples, 90-line miles of geophysical surveys and 16,500 feet of diamond drilling. The present claim holdings of the joint venture are shown on this 1 to 250,000 scale map.

I don't know if you can see it there. They're outlined in red on that map. The Tyrola claims which are outlined in black, do not belong to the joint venture, but reportedly contain mineralization similar to our Big Sore prospects. Of our six claim groups, the most time and effort to date has been expended on the Big Sore Tom claims. A total of 36 holes were drilled on the Big Sore Tom claim group by the end of last field season. I think you can see these dots here. Each one of these little red dots on this map represents a drill hole. The Big Sore prospect area, which is this area right here. In the Big Sore prospect area, 17 ore grade intercepts have been outlined over a straight length or a horizontal distance of approximately 3,500 feet. We presently have drilled indicated reserves to the 1,300-foot level in this area, with 2.1 million tons of material grading, .41 percent copper, 3.3 percent lead, 10 percent zinc, 9.5 ounces of silver per ton, and 0.13 ounces of gold per ton. These values would give a gross metal value per ton, at today's metal prices, of $155 per ton. The net smelter return on this material or the value received after smelting and refining costs are deducted would be close to $100 per ton. I would like to emphasize that this material, again, is drill indicated and not assured ore.

We feel that exploration down dips into the south, southeast could possibly give us an additional 3 million tons of similar grade material and exploration on the upper hold then of the mineralized zone in this area to the northwest, could conceivably give us another 5 million tons of ore grade material. Therefore, the total geologically inferred reserves in this area are in the range of 10 million tons.

Within the Big Sore claim block, we have approximately 26,000 feet of strike length on the favorable mineralized stratigraphy. Of this, only about 6,000 feet have been tested by drilling to date. Four holes have been drilled in what we call the Gallagher Creek area, which is right here. Two holes have been drilled in the lower Killer Creek area, which is right here. One hole in the Killer Creek area, right here, and two holes have been drilled in the upper Killer Creek area. Undrilled, but planned for future exploration work at the present time are the Berm Creek area, which would be right up here, the west Gallagher Creek area, over in here.

Mr. Quarles. Could you locate those on the other map there in relation to the claims?

Mr. Butler. OK. Right. This is the Big Sore claim group, this patch right here. This black outline here is the outline of Big Sore claims. The additional work is also planned in the Mariposite Ridge area. The Mariposite Ridge area is what we call this area right up here. For next field season, we plan a helicopter supported underground exploration operation in this area, to accomplish roughly 20,000 feet of diamond drilling. Approximately 4,300 feet of that will be driven in to the Big Sore mineralized zone and approximately 60 to 70 drill holes will be drilled from this added on to 150-foot centers. Total amount of drilling underground will be approximately 18,000 to 20,000 feet. The purpose of this underground work next year will be to develop sufficient tonnage of the assured ore to be able to make a prefeasibility or engineering evaluation for the property by the end of 1978.

I would just like to briefly point out these other areas on Northern Admiralty Island, where we have found mineralization similar to the Big Sore deposits, beyond the P.T., the J.S., the Baron, the Skull, and the Eagle Peak claims. These claims groups, we have not found any mineralization on these claims similar or of quantity that we found on the Big Sore group to date, but on the other hand, we haven't really explored them as much as we have the Big Sore claims at this time.

I won't bore you with the details of each one of these claim groups, but there is geochemical anomalies, generally, E.M. geophysical anomalies, gossans, ferricrete deposits and other indications that significant mineralization may be present on these claims. The J.S. claims, last year we drilled three holes on the J.S. claims, which would be this group right here on Mansfield Peninsula and only marginal grade base metal mineralization was encountered in these three holes. There has been no drilling on the other claim groups. Other mining claims on Northern Admiralty Island, which we are familiar with, include a large block of claims just north of R.J.S. claims, which belong to Sam and Andy Pekovich of Juneau. They're not on this map, but they're located just north of the J.S. claims. There are presently four passive mining claims within the boundaries of our Big Sore claim group. And, as I mentioned before, the Tyrola claims are located 6 miles to the south of our Big Sore claims and to my knowledge, the Tyrola claims contain similar types of mineralization to what has been found on the Big Sore property.

I would like to submit for the record a report that was turned into the Forest Service last summer, and I think that it lists some of the areas I've been talking about here and also I would like to submit this location up here for the record, and at this time, I'd like to call on Leo Mark Anthony, who will be telling you a little bit more about the Tyrola claims.

Mr. SILVER. May I ask one question?

Mr. QUARLES. Sure.

Mr. SILVER. Actually two. How long would you expect the life of the development to be and how many jobs do you anticipate would be generated?

Mr. BUTLER. Well, it will depend entirely on the potential tonnage that is found there, but I would say a minimum of 6 years and maybe a maximum of 20 years or so, depending on the total tonnage.

Mr. SILVER. And that's tonnage—oh, excuse me.

Mr. BUTLER. Pardon me?

Mr. SILVER. Can you estimate the labor that will be generated by that?

Mr. BUTLER. It would be pretty tough at this time, but I would say at a very minimum, probably at least a hundred persons would be employed, assuming that the minimum figure of 2 million tons was all that was found. It could be considerably more than that.

Mr. HAWK. I was just wondering, Mr. Butler, how much tonnage you think you need for an economical operation?

Mr. BUTLER. We estimate at this particular grade, probably around 750,000 tons would be sufficient to make an economical operation.

Mr. HAWK. Just 750,000?

Mr. BUTLER. Right.

Mr. HAWK. Is that ore or is that——

Mr. BUTLER. Ore.

Mr. HAWK. That's ore. What grade of copper did you say that that was in there, 0.4 percent?

Mr. BUTLER. 0.41 percent copper and 3.6——

Mr. HAWK. How would that compare to the total copper production and zinc production in the United States today?

Mr. BUTLER. I don't have those figures off the top of my head.

Mr. HAWK. Well, what I was trying to get at is, how does the size of your anticipated operation compare to proposed or existing mining of the minerals in this area?

Mr. BUTLER. This operation would be very similar to the mines in the Coeur d'Alene District, if you're familiar with that. Some of the deep silver mines in the Coeur d'Alene District are 100 to 200 feet.

Mr. HAWK. I guess what had me confused was reading the Holdsworth report. Phil listed the estimated tonnage at the various prospects that you've discussed and I think the Borax Claim, gosh, it had 250 million tons that they've discovered and, you know, that Phil said looked pretty economical and here, you're only talking what, 2.1 or 10 million tons will be economical near Juneau.

Mr. BUTLER. That's right. It really doesn't make too much difference on the size of the deposit, Ron, as long as it pays a profit per unit value. This is a high unit value deposit. We're looking at $155 per ton on this material, whereas the Borax Claim, you're looking at $12 or $15 per ton, which makes the difference.

Mr. HAWK. I was under the impression that probably if you did go into production that you would have to tunnel, because the veins are spread out and they're all vertical.

Mr. BUTLER. That's probably correct, yes.

Mr. HAWK. How would that—how much more costly is that kind of process?

Mr. BUTLER. It's considerably more costly than an open pit type operation. Probably——

Mr. HAWK. Would it be considerably more costly in Alaska?

Mr. BUTLER. Yes.

Mr. QUARLES. Go ahead, Leo.

Mr. ANTHONY. My name is Leo Mark Anthony. I've been a professor of mineral exploration for the University of Alaska for 27 years. In the summer months, I have my own exploration outfit. Mark III Exploration. I've been doing mineral exploration in Alaska for 32 years and I've been doing exploration in southeastern Alaska for 20. I know a thing or two about it. The first map there is of Admiralty Island it shows the Tyrola group of claims that I control and God and Congress willing, I can make a mine out of it. The Tyrola claims consist of 15 gold claims and you will note on the map that they adjoin the Goldbelt Native selections on Admiralty Island. They're located at the headwater of the Kathleen Creek, about 28 miles southeast of Juneau.

As a proposed road off on the map, the Forest Service planning unit is aware of those claims, I've sent them a copy of it. Without that road, there'll be no mine. You'll notice the road is on Goldbelt Native selections. We consider the Goldbelt Native selections completely compatible with our mining operations and I believe they do, too. Any questions on that before I proceed?

Mr. QUARLES. Go ahead.

Mr. ANTHONY. The second map shows the Tyrola location at the headwaters of Kathleen Creek, it's on Tyrola Creek. The third map shows the claim block in detail. The fourth map shows the general geology of the northern part of Admiralty Island. The Tyrola is located in the Middle Paleozoic rocks of Northern Admiralty Island, a highly mineralized belt of rock. As Tom Butler of Noranda just stated, our mineralization is very similar to his, with one exception. One gangue mineral is barite and this deposit, we've done quite a bit of surface work on. We have a vertical section that's eight hundred feet exposed in trench. We have a horizontal section that's about twelve hundred feet of strike lengths, an anticlinal structure shown on the next map. It's a volcanogenic mineral deposit, and it's stratabound in an anticline. It averages forty feet wide and it contains just slightly under 5,000 tons of ore per plunge foot. Well, I'll give you some indication of what it conservatively could do. We could conservatively probably produce 200,000 tons of barite a year, which is a significant percentage of the U.S. barite needs and production.

Mr. HARVEY. Do you have a number off the top of your head there, Leo?

Mr. ANTHONY. What is the U.S. production? About a million and a half. About a million and half tons a year. Well, we could actually, you know, if we wanted to go, produce a lot more than that. But that's a gangue mineral as far as we're concerned, you know, it's a lower value mineral, as far as value.

Mr. HARVEY. You're saying that you think about 12½ percent?

Mr. ANTHONY. Right, it's significant. OK. That'll pretty well summarize what I have to say about the Tyrola. If you have some questions, I'll be glad to answer them.

UNIDENTIFIED VOICE. What's barite used for?

Mr. ANTHONY. It's drilling mud, principally, It's also a substitute for lead in paint.

UNIDENTIFIED VOICE. Thank you.

Mr. ANTHONY. There are other uses for it also.

Mr. HAWK. I was just saying, are you familiar with the barite cross section in the Haines area?

Mr. ANTHONY. In the Haines area?

Mr. HAWK. If so, I was wondering how they compared to——

Mr. ANTHONY. They're much smaller, and by the way, I should add this for the record, and that is that this a pyrite—a pyrola? A deposit. We have good indications that we have several other ore bodies. One of them seems to be about the same size. We have to drill it.

Mr. QUARLES. Do we have anyone else who wishes to make a presentation on nonfuel mineral?

Mr. BARNETTE. My name is Greg Barnette, I'm with W. G. M., Inc. The past two summers, I've supervised a minerals exploration program in southeastern Alaska, working principally on southern Admiralty Island. In 1976, we started the program and made several discoveries on the southern part of the island, consisting of mineralized stream float and rather extensive geochemical anomalies, which we staked claims on, which are five separate claim blocks which comprise three groups and we worked on these pretty extensively the past year, although we haven't begun to approach the stage of development that Noranda's had on their property. I would like to, first off, submit a map for the record. This is a map which I compiled from the district recorder's office, the State records and from talking to individuals in mining companies, and it shows all of the claims which have ever been staked on Admiralty Island. They're located on here according to the degree of accuracy with which I was able to obtain the information, and at a later date, I can submit a table which goes along with this, which has the names of who staked them, when, extent of development and that sort of thing, so whatever I have to do to submit that, I'll do it.

The claims which I'm going to discuss are shown in red here. The H.P. and Babe groups are on the west side of Pybus Bay and the southern part of the island. Patty and Joan groups are just to the north of Gambier Bay and the Petunia group is near Yellow Bear Mountain. I'll just briefly describe what we've got at these, and the thing that I would like to emphasize is the rather early stage of exploration that we're at on the properties. I can't give you any kind of tonnage figures, but when I say that a property has a good potential, that's my opinion as an exploration geologist and has to stand as such.

The H.P. and Babe groups are 295 claims or approximately 250 acres near Pybus Bay. We have a few chemical anomalies there, namely, copper and zinc. With copper values ranging from 250 to 3,500 parts per 1 million copper and stream sediment samples, versus a background value for the area of 60 to 90 parts per 1 million. In my experience in Alaska, which is just 4 years, that's one of the strongest copper geochemical anomalies that I've experienced. It covers approximately four square miles. Our 1977 work was mainly geologic mapping, soil sampling, trenching and geophysical surveys. The soil sampling outlined in anomalies, two anomalies that are parallel, one of them on the H. P. claims is 4,500 feet long. We consider anomalous copper values in soil to be from a thousand parts per million to over 2 percent. An approximately minable grade, we think, would be around 1½ percent copper, and in the soil on the ground, we have numerous samples running over 2 percent per ton. There's a parallel anomaly to the south on the Babe claims, which is 3,000 feet long and has the same range of copper values there. These two anomalies are parallel to the strike of the underlying rocks. They're on opposite limbs of the breached anticline and represent the same stratigraphic horizon. We found copper minerlization in carbon and argillaceous rocks with grades ranging from a few tenths of a percent copper to as high as 10-percent copper, but the exposures were found to be pretty poor and pretty weathered, so we don't really know what kind of grades we're looking at.

We've also found zinc mineralization in talus and we have extensive stream sediment anomalies in zinc. The talus grades we've got are from 3 to 12 percent zinc, with around 1 percent cadmium, but we, to date, have not been able to trace the source of these, so we don't know what we're looking at in terms of potential, but the zinc geochemical anomaly covers about 3 square miles at the northern end of the property. The size of the soil anomalies and the fact that they parallel the strike of the underlying rock suggests to us that we have very good potential for a large tonnage, stratabound copper and zinc deposit. But what we need to is drill. The clients who I'm working for on this, which are Saint Joe Minerals, Inc. and General Crude Oil Corp., at this time are reluctant to put any money into drilling because they're unsure of their land tenure.

The Patty and Joan groups, which are near Gambier Bay, are 339 claims or approximately 4,890 acres, discovered in late 1976. The composite zinc, lead, copper, barium stream sediment anomaly with a half dozen talus and mineralized float finds that we made. In our work this year, we exposed a strata of solidified calc-muscovite schist, with bands of massive sphalerite, which is zinc sulfide. The strata where we exposed it intrenches anywhere from 6 to 9 feet thick and had grades ranging from 3 to 17 percent zinc and 1 to 1½ percent cadmium. Based on our mapping and structural geology, soil sampling and mineralized talus occurrences, we're got potential strike lengths of 3,000 to 3,500 feet, which in our judgment is a reasonable potential.

We have about a dozen soil geochemistry and geophysical E.M. anomalies in other areas of the property that are heavily wooded and covered with tundra, that we haven't been able to evaluate. We have another area on the property where we've found a 200-foot long, approximately 20-feet thick, but I'm not sure about that thickness, massive pyrite with some calcopyrite horizon that's in an amphibolite, with grades to 0.8 percent copper, but that's pretty much unevaluated.

The Petunia claims, which is our last group, is near Yellow Bear Mountain, more toward the center of the island. It's 56 claims or 810 acres. It's a composite lead, zinc, silver, gold geochemical anomaly and it's particularly impressive as a gold anomaly. Gold in stream sediments on the claim block run from 100 to 450 parts per billion, versus a background value for the area of less than 20 parts per billion. The area is pretty heavily covered and we've done less work there than on the other properties, because we don't think the potential here is quite as good. But we've got a strong E.M. anomaly paralleling the strike of the underlying rocks, with virtually no outcrop and outcrops we have found have vein and stringer type mineralization of lead and zinc. This couples with the high gold values, which we think are coming from a small diorite stock, lead us to think there's potential there for either contact metamorphic base metal minerals, possible something stratbound type of deposit, or a bulk tonnage gold diorite.

I'd like to add, Mr. Hawks mentioned the Holdsworth Report for the U.S. Forest Service, which—I was aware of Mr. Holdsworth doing work for the Forest Service on minerals in the Tongass, and I'd like to point out that Mr. Holdsworth did not consult W.G.M. to get any data with regard to minerals there. And I've presented what may seem an excessive amount of detail, largely because this information hasn't been presented anywhere else. The maps which I'll give you have got the Noranda claims on it as well and the locations were supplied by Tom Butler.

Mr. PITTMAN. Well, for the record, there's a historic gold mining area on the northern part of the island, where the production has extended from around 1890 until the 1940's. On one of these properties just north of Hawk Inlet, there is an active exploration program set up for this coming year. There is in addition to that, a nickel-copper deposit with a very considerable drilled out tonnage of nickel on this northern portion. In addition, there are some copper prospects in the Windfall Harbor area, being actively explored by individuals who are not represented here today. One of these individuals is the prospector previously mentioned, who has been very compatible with the Windfall Harbor-Pack Creek brown bear population for some number of years.

In addition, the U.S. Geological Survey, in professional paper 400-B, points out two areas of rather unique mineral potential on Admiralty. These two areas lie in the relatively unprospected areas between the Noranda operations and those headed up by W.G.M. There is about a 100-square-mile area that's north of Bear Lake and west of Mole Harbor in which they show higher than normal amounts of minerals of copper, zinc, titanium and iron. There is another rather unique area just to the north of that, about 5 miles west of the head of Seymour Canal, in which they show anomalous amounts of a considerable number of the rare earth minerals, with some radioactive minerals. Those occurences are a definite indication of mineral potential in that area between the two more intensively explored areas.

Transportation and Access

Mr. QUARLES. Thank you. Now for the final topic concerning Admiralty Island. Does anyone wish to state any views whatsoever on the transportation or access question? Yes?

Mr. HUGHES. Yes, I'll be very brief. Andy Hughes, State Department of Transportation and Public Facilities. The island currently is accessible by air and water and the only community on the island, Angoon, this past summer received ferry service for the first time, with the completion of a ferry terminal. In 36 transportation workshops conducted in 19 communities throughout the region, southeastern Alaska, this past year, no suggestions were offered that the Southeast Transportation Study consider any roads on the island. The only transportation improvement currently being studied in connection with the study is an airstrip to service the community of Angoon. That's all.

Mr. QUARLES. Yes?

Mr. ALLINGTON. I just think it should be pointed out, as Mark Anthony pointed out, that if Goldbelt in particular and Shee Atika would get selections on there, there will be some transportation facilities needed for their exploits, including roadways and possibly docking facilities. That's dependent on the selections.

SOUTHEASTERN ROADLESS AREAS

Scenic, Landscape, Historic, and Archeological Values

Mr. QUARLES. All right. Because of the time situation, the suggestion I think will follow that we simply ask each of the people now to address all other areas under consideration in southeast Alaska, instead of going through Misty Fjords before we do it. That, of course, means if any people wish to concentrate on Misty Fjords, that's fine. Because of the time, we strongly urge you simply not to catalog values as you find them, but only discuss those where you feel there may, indeed, be a conflict of values or a conflict in potential uses. Again, let me urge anyone, if they feel that any area in the southeast has not been discussed fully enough or has not been addressed at all and should have been addressed, to simply submit as succinct a statement as they possibly can for printing in the record and we'll do everything we can to print it in the record.

The first subject is scenic, landscape, historic, and archeological values. We will also accept any statements on wildlife and fish resources and uses. Obviously, we have many areas, so once again let me simply say that you address only those that you feel are most critical and if there may be potential conflicts.

Mr. BEHNERT. Mr. Chairman, in light of the time constraint and in light of the amount of information that could be gotten from the group, we have in the fact sheet relating to the southeast area, extensive information relative to mining claims, coastal features, archeological sites, the whole host of things that you're asking about, and I would suggest that these might suffice for the purposes, in the interest of speeding this thing up.

I would like to address the amenities map we have again, and discuss some specifics on that to talk about what values have been accomplished with that. With respect to the amenity composite that you see on the left-hand side here, we basically portrayed all of Southeast with respect to the combination of values that were derived from these multiagency task forces. Principally, the ones that we're concerned with, fisheries, both sport and commercial, wildlife and what we call ecotype diversity, which was an assessment of the land base with respect to topography, vegetation, water bodies, ecological diversity in its overall sense. You can see that the areas that are proposed in, basically, S. 1500, which encompasses all the areas that are portrayed on the map, take fairly good advantage of the amenity values that we have analyzed. In fact, of the ones that rank highest on the scale, the total set of units take advantage of about 60 percent of the units that are rated in the highest category. They take advantage of approximately 42 percent of the units that are rated in the next highest category, 33 percent of those rated in the moderate category.

I would like to point out similar statistics as we look at the commodity ends of the equation, because they're also significant, encompassing aspects to those. The other thing I'd like to say, that the basic values that are presented on the map are underpinned by extensive composite data with respect to each unit that has been analyzed and we would be happy to supply you with detailed information about any portions of these areas that you have questions on.

Mr. CALVIN. My name is Jack Calvin. There are a lot of old timers here, so I will mention the fact that I have lived in southeastern Alaska mostly in the Sitka area for 46 years. No, for nearly 35 of those years, I have made fairly extensive use of the area we call West Chichagof/Yakobi. I'm not going to take the time to try to describe it, because we're too pressed for time. I would like to read one sentence from a report that was made by a soils scientist who was a member of the team that did a land use study on West Chichagof. Here's a quote—

> In its entirety, the West Chichagof/Yakobi area contains, in one geographically compact unit, nearly as broad a spectrum of physical environments, values, challenges, and awards, as found throughout all of southeast Alaska.

To that, I would say amen and tell you only what is essential about the area. One of the gentlemen noted a while ago that the outside coast was beautiful. It is. It is perhaps the most spectacular part of the area, though some people would dispute even that.

The outside coast is composed of a mass of islands. The proposal area beside the West Chichagof area and Yakobi Island contains four, probably what we would call large islands and hundreds and hundreds of smaller ones. This makes it a perfectly fascinating area for boating people. Any boat from a canoe up can use this area and many canoists and kayakers are using it. I have made the trip from Sitka to West Chichagof probably several hundred times.

Now, all kinds of boats, from fish packers—I operated a fish packer out there one year, down to my present cruising charter boat and from there on, down to canoes. I have made the trip in a skiff and so I like to have people say, well, this is just a rich man's place, a poor man can't get here. I'll tell you any man that can lift a paddle or pair of oars can get there if he wants to. The other means of transportation, I'm having to cover all subjects here to get this over fast, if you don't mind. The other means of transportation, as for all of southeast Alaska, is, of course, air. We think this is a fine arrangement. Not everybody thinks that roads and automobiles are that valuable, and when you can get an area that is accessible only by boat or air, you have a number of game.

One of the reasons that we picked the West Chichagof area to propose as a wilderness 10 years ago was the fact that those of us who were working on it knew, from our own knowledge and from talking with other people, that there was comparatively little timber in the area and we figured that by picking such an area, we would have less conflict than otherwise with the timber industries. I won't go into the timber volume. I wish I could, but suffice it to say that it is a poor grade of timber.

A very considerable amount, more than half of the total area of timber is marginal. It is probably the lowest grade stand of timber of anything in Southeast. The mill people and loggers and the Forest Service all know this very well. But what they have done is to take our proposal, which went successfully through the subcommittee of the House and the administration recommendation has come down as cutting the area in half.

Probably back in Washington, somebody put the squeeze on somebody and said, we've got to cut the acreage down on the wilderness study. So they started to look for places to cut and one of the places that they discovered was the east side of West Chichagof. Now, we feel that there are very powerful reasons why this area should not be cut. In the first place, there is no way to divide that area by natural boundaries. When God made the area, he was angry about something and he hurled the mountains down without bothering to build any connecting bridges. There is no backbone to the island, nothing that you could follow and say that the drainage is here and here. So any line on that map has to be just an arbitrary line. If you followed the heads of the streams in order to more or less segregate the drainages, you would have a sawtooth line. That's a nice pretty line there, but I don't think that would stand up. A sawtooth line in which the arrowhead-shaped point from the logging side would put logging outfits in the middle of the wilderness area. The total boundary would be a boundary between wilderness and logging, which is not in conformity with wilderness practices.

Furthermore, most of the timber, all the condensed stands of timber in that area are in the southeast corner, fronting on Hoonah Sound and for a ways on, fairly straight. Now, I said it was not very good timber. It is a low-grade timber. It could be duplicated out of other areas, the industry areas or some of the so-called independent sale areas without any difficulty. There is a contract which is held in high regard between the Forest Service and the Japanese pulp mill and this area, in fact, all of West Chichagof, was included in their area. Well, there's not much timber on the west side. There are some little pockets, much too small for any logging outfit to bother with, and it is a serious question whether the timber on the east side would interest one of the big logging outfits. It's too poor and they just wouldn't want to bother with it. Now, I've spoken of boundaries. People don't necessarily recognize a line drawn on a map. They could anticipate trespass, whereas with the area as we outlined it, they have an almost perfect administrative boundary. I have carefully plotted the beach line around the entire area and it is 550 miles of beach. The total land mass is about 60 miles long and it varies in width from maybe 9 to 14 miles. This figure gives you an idea of how convoluted this beach is. There's just innumerable bays, inlets, saltwater lakes, all beautiful bordering countries and countries that can be reached by anyone. Some people say, well, you can't have wilderness, because people on wheelchairs can't get to it. People in wheelchairs can in this case. They can sit on the deck of boats and see a great deal of the wilderness.

Before leaving the beach entirely, I would like to mention that this stretch of outer coast along West Chichagof is probably the richest one left in the North Pacific. Originally, the coast at Monterey was the richest and the second one was perhaps just down the border in lower California. The Sitka area, right around Sitka, was the third and the West Chichagof area was not known biologically. As far as I know, no biologist had looked at it seriously. We know now that the west side of Chichagof is probably the richest area left and the other areas have deteriorated because they had too many people, schoolteachers taking kids in and said, now, kiddies, everybody get a starfish and take it home, and it doesn't take very much of that to wipe out the life on the beach. This is immensely rich and immensely valuable to biologists.

Now, to go back inland to the country, I told you the mountains were timbered. It gives all variety of opportunity for recreation. If you want to climb rock cliffs, go on up, they're there. If you want to climb easy slopes on snowshoes or on foot, go ahead, they're there and climbable. There are alpine valleys. There are hundreds upons hundreds of little lakes scattered around in the interior. Innumerable streams running down to the shore, many of them with fish.

Now, for other animals, wildlife in the place, we have the standard bear and deer for the big game. You've heard some brown bear stories and we know we all concede that Admiralty Island is the richest place left for brown bear. The West Chichagof is no slouch. I'm not a bear hunter, but I know a bear when I meet him and I have met quite a number in the Chichagof area. I like them and leave them alone, as long as they leave me alone, and they have so far.

Deer hunting there is excellent. In fact, the fish and game people keep telling us to get out there more and harvest more deer. There are too many. There are land otter in some quantities, and there are sea otters which have been planted back in their native habitat. They are mostly concentrated off Yakobi Island. Some were planted in the neighborhood of Khaz Bay. That's about where the old gold mine was, and they have not done so well. But those out at

Yakobi Island have done very well. The biologists watch them through their glasses and count them and judge their health and their state and they're very happy to find that there are sea otters of all ages in there, indicating that they are growing in size.

Now, it was not my intention to mention minerals, but our miner friends have tonight put on an excellent exhibition. They have their testimony very well organized and they've presented it very clearly and I know that they have some on this area, and as I may not get another chance, I'm going to give you a little bit of a different view than they will present. Gold was discovered in 1904 by a couple of natives from Sitka. Within 3 or 4 years, a mine was in operation there, now usually known as the Old Chichagof Mine on Klag Bay. It was not immediately successful and it changed hands several times and failed and somebody else tried. Eventually, they found a good spot in the vein and took out a number of millions of dollars. It was a highly successful small mine. Right across a saddle back in the mountain, on the same vein, a second mine known as the Hirst Mine was started and they ran simultaneously for quite a number of years. Both closed down at about the start of World War II. There's ruins of a couple of small gold mines that were unsuccessful, over on the other side of the area, on the Slocum Arm. No, not the Slocum Arm, the Lisianski Strait, that's right. Up in Bohemia Basin, there is a deposit which you will hear more about, which was discovered long years ago. I'd hate to put a date on it, but 30, 35 years ago. The Government geologists went in and surveyed the area. They made findings and measured it and wrote it all out in neat tables, just exactly what was there. Their judgment at the time, which nobody has ever been able to revise, was that it was not rich enought to mine, considering the extra costs of mining in Alaska, so it has never been mined. Well, there are people there now looking at it, talking about mining. Maybe they will.

I've been a little puzzled tonight that there has been so much testimony from miners, when after all, mining is permitted in wilderness areas. They might have to be a little more careful with their road building, but still they can stay in business. Now, since 1904 when the gold was discovered, I doubt if there has been a single year when there wasn't at least one good, old time prospector with a pick axe and a shovel and a pack on his back, working in West Chichagof. There are minerals there. Nobody denies that, but I mentioned the fact that God was rough on the mountains. He was also rough on the earth and instead of having nice, neat veins running along, things were torn up and churned and your vein may come up to, what is it, a wall, something like this? It just stops and this is apparently what happened to the mine at Old Chichagof. They ran into a wall, poured back some of their earnings, trying to find it again, and by that time, the war thing had shut them out and the mines had never started again.

Now, from 1904 until 1978 is quite a stretch of time, roughly three quarters of a century and people have been looking in there, and any prospector who looks can find minerals. There's no question about it, but nobody has ever been able to find minerals in a minable quantity and quality to set up all the shipping and the machinery and everything that goes with it, so there has been no development. I know you'll get optimistic predictions that there's going to be development, but maybe this is a horse of a different color.

I think I've said most of what I want to say. I'm going to turn it over to Mark.

Mr. JENSEN. Mr. Chairman, my name is Mark Jensen and I've spent 35 years right on the outside coast of Chichagof, about 2½ months a year there. I've had a cabin there for over 30 years. Many of the things that Mr. Calvin said, I agree with. I'd like to just make a couple more points that haven't been made. In my experience out there, you look at that coast and you're looking at a very rough coast. The boats that use that area and enjoy it, you might say, as a wilderness area, use it a very limited amount of time during the few months of the summer. If you're there early or if you're there late, you have to have protection from the weather and from the environment, other than, you know, a cabin, well stocked with wood and things like that. I support the Forest Service 5-year study called the (d)(2) alternate, which is that part of the outside coast for recreation and to me, that's very practical. Every year, I go way out on the ocean and, you might say, count the sea otter. This year, I counted over 50 pups right on top of the females, just floating in the big surf away from the myriad group. There's over 200 sea otter right out there in the ocean right now and they're multiplying very fast. In my opinion, some of them should be harvested, because of the impact they're having on the feed area. But if there's ever an area that is limited because of weather, it's that outside coast and I think that as far as the wilderness view or the wilderness climate, it wouldn't be hurt at all by protecting what you do need to do there, classifying it as a recreation area.

Mr. HARVEY. Are there any more comments on the scenic aspects of Southeast, other than the parts we have covered already?

Mr. BEHNERT. I'd like to make a comment on Mr. Calvin's testimony. Many of the points raised in regard to the scenic values, wildlife values, would be verified by our report, however, with respect to timber, we do think there are timber values, especially on the east side of the island, and that is one of the bases for the recommendation that the administration has come forth with. There are figures here that say that there are substantial timber resources on that part of the island.

Mr. HARVEY. Yes; go ahead.

Mr. BODDY. My name is Bob Boddy, I'm a retired fishery biologist from the Ketchikan area. I have 41 years in Alaska. I would like to comment first on the Misty Fjords area. In my 21 years in the Ketchikan area, I have visited this area many times. Also in line of duty as a sport fish biologist there, much of my activity was in the Misty Fjords area. I have stocked in excess of 20 different lakes there with rainbow and grayling. The Misty Fjords, from the standpoint of scenic values, is one of the finest left on earth, undoubtedly. It ranges from the deep glacial fjords, some of which are over 200 fathoms in depth, having good achorages at their heads, flats where one can observe black bear, brown bear, cinnamon bear and I know of one instance, Mark, where a blue bear was taken in the quadrant.

It almost defies description. It runs from the glacial- to the fire-formed scenery, such as the lava flow that came down the lava fork of the Blue River. Flowing down the Blue where the lava flow attempted to dam the Unuk River. This flow is so recent that one can still see the outlines of the logs that were knocked down by the lava flow on the top of it. The whirls, the convolutions, the natural bridges of lava across the Blue River are very much in evidence. It is a very, very spectacular view. There is other excellent fishing in the area from the saltwater, the usual fishing for king salmon, other salmon, five species of salmon in the area, and one fish that hasn't been mentioned here is the candlefish or hooligan, which runs the Chickamin. The Unuk River has been known from a number of other streams there. The Stikine River is a glacial-carved river bottom, again, quite spectacular, one that lends itself well to river running parties, either drifting down or paddling up. It has all five species of salmon. It again is a repeat of the spectacular qualities that one might see in Misty Fjords. Etolin Island is unique in that it probably contains as much alpine area as any of the—more so than the smaller islands of the Southeastern. It has many hanging lakes, many of which are still without fish. These lakes were ice filled. These basins were ice filled when the country raised up and when the ice melted out, the barriers had established the outlets of the lake and no fish populations have ascended into them. I wasn't able to plant them all, but I tried.

Duncan Canal is close to the heart of the people of Petersburg, in that it is a great recreation area from the standpoint of waterfowl, from sport fishing, salmon fishing, that is; cohos, superb searun cutthroat fishing. There are steelhead there. As I say, it is cherished in the hearts of the Petersburg people and they would want that set aside.

The Tebenkof area is unique in that it has not had much sport fishing pressure yet. Here we have four species of salmon running what is essentially a rather small stream in the Alex Creek area, a very fine steelhead run. I'm prejudiced towards steelhead; you've gathered that. But rainbows, cutthroats, and of course the dolly varden. It certainly merits consideration for setting aside and not destroying the scenic values that it has now.

The Yakutat Forelands and particularly the Situk River, I could take all afternoon on that one. Suffice it to say that the sport fisheries potential of the Yakutat Forelands has not been completely explored to date. There are the five species of salmon there, as well as excellent steelhead runs, hooligan runs. It is really something to see. It might be said that the very dedicated, deserving, blessed steelhead fishermen of the world, if he's really behaved himself, should be allowed one-half a day on the Situk when it's good, because after he's had that half day, there, then he may go to hell, because he's been to heaven.

The Karta River, being close to Ketchikan, is a very spectacular fish stream. It's unique in that it has a fall run of steelhead and a spring run. It also has a good run of cutthroats, dolly varden, and four species of salmon, no king. There are a number of large lakes there. It is a very pretty area. It is very popular, being played by the people of Ketchikan at the present time, and if you don't believe that, you ought to try to get a cabin there on a weekend during the time when the steelhead are running. It's impossible. It is one of my favorite fish streams in the Ketchikan area.

Salmon Bay and Lake also enjoy a fall run of steelhead and a spring run. It is a very popular area for the take of waterfowl, for deer hunting, and for sport fishing. The lake has fine beaches, a recreation cabin, and is an excellent recreation area.

The Sarkar Lakes were relatively untouched until the logging camp went in there near the mouth of it. Whether it is now, I'm not sure. However, it was unique that in the inlet of the lower lake, there is a fall there that delays the salmon run and here one can go observe them, watch black bear catch fish. You can take all the trout that you can possibly use. It is a very fine area. The lakes above having populations of cutthroat and excellent fishing generally. It is quite scenic, open areas, muskegs, large weed beds in the area, and it is a highly productive system, well worth protecting. I will not take any more time on this, other than if there are any questions. I would appreciate being asked to answer them.

Mr. HARVEY. Thank you very much. Does anyone else have any comments on the scenic and wildlife values? Go ahead.

Mr. GORDON. I'll only discuss about, oh, less than half of the areas and I'll try to make this as brief as possible. But I do think that a formal description of some of these values is worthwhile. I feel pretty humble, because Bob Boddy and Jack Calvin know 10,000 times as much about Southeast firsthand as I do, but somehow I'll try to do what I can.

The previsual characteristics of West Chichagof that I think are unique in Southeast Alaska, No. one, is a bedrock wave cut plain on the coast, variable soil, and therefore the trees don't grow very well.

The shapes of the trees, to be brief, look like a Japanese garden. I don't know of any other place in Southeast that looks that way. The second thing is that the rock, the bedrock outcrops on the shore are massive and rounded, smooth bedrock. It's very similar to the San Juan Islands, near the Boundary Waters Canoe Area. It's a characteristic shore type of landscape, again, that probably doesn't occur very many places in southeast Alaska. This is rounded bedrock. In that regard, a place called Mirror Harbor, which is sort of the ultimate of that type of scenery, is a place where there is a mineral claim and, if any place is special in West Chichagof, this is the place. It is the logical anchorage point, it is the anchorage point for people who walk in a short distance from there to White Sulfur Springs, which is very popular for fishermen and boaters, and this place, if it were scarred by any kind of mining, and we're only talking about a few hundred acres, it would just be criminal. The Tebenkof Bay is a classic example of a deeply inset, very scalloped bay, fairly flat country. The best illustration I can give of what it looks like is that the next bay north is called Bay of Pillars, this bay has the same characteristics in its islands.

The next area, Rocky Pass. This is a classic example of one of the rather narrow, tenuous, rockfilled passages through the islands of southeast Alaska. It is very rich in waterfowl. It's one of the outstanding areas for waterfowl. It's very narrow, and because of the combination of the rocks and the narrowness, it's a very scenic passage. It gives you the feeling of the lower country, where you're looking at the foreground, rather than the high islands behind. But the close view is what you experience in a boat.

Etolin Island, the southwestern part to south-central part of the island has a combination of two values. They have a number of extremely narrow, extremely long inlets which are duplicated in two places in Southeast. I'll mention one. But it's a very characteristic land form. These inlets are many, many times longer than they are narrow. They penetrate deep into the heart of the island. There are three of them. In between them in the highlands, as Bob Boddy has indicated, is an outstanding system of alpine lakes. The Yakutat Forelands is considered Forest Service land use plan, as stated, that that is the finest overall fish and wildlife area in southeast Alaska. The Department of Fish and Game has proposed it as a critical habitat area. It, along with Russell Fiords, is the primary habitat for the glacier bear. I'll refer you to the environmental impact statement for further discussion of that resource.

The Stikine has been covered. I want to talk a little bit, though, about Misty Fjords, because that represents a number of types of landscapes in one place. John Muir referred to Alaska as having a thousand Yosemites. This is a geologic fact and the geology of the Misty Fiords area, this is the area on the east side of East Behm Canal and north of Portland Canal, the southeasternmost corner, has more of this type of landscape. Steepsided, almost vertical, exfoliating massive granite, rounded glacial scoured domes on top, very long narrow fiords. The reason that that there's so much of this type of landscape in Misty Fjords and you can see this from the topo map, is that many, many of the valleys penetrate all the way through from one end to the other. It's not like Tracey Arm to the north. You have an interconnection. If you look at the map, you can see this interconnection, the low elevation between many of the valleys.

They have hundreds of fiords and landlocked U-shaped, vertical walled inlets. That's probably the most famous aspect of it. There are three others that are equally worth mentioning. The southwesternmost corner of the mainland, this is immediately north of Portland Canal, immediately east of east Behm Canal, in other words, if you'll look behind you there, the gray area that's shown as Misty Fjords, essentially, the bottom part of it on the right side has the most outstanding example of the feature I mentioned for Etolin. Extremely long, extremely narrow inlets, a few hundred yards wide, usually very swift current at the entrance, up to 12 miles long. This is a classic type of landscape which is nowhere else in Alaska, nowhere else in the United States, as well represented. If there are any compromises that ever are made on Misty Fjords, it would be a crime to remove these series of southern area inlets that you can see on the map in that area. The third or the fourth aspect is directly across on the southestern edge of Revilla Island, Revillagigedo on the map, Revillagigedo, but it's called Revilla Island, and that area has the most extensive series of alpin, subalpine large lakes, small lakes, rock basin cairns of probably any place in southeast Alaska. I'm not saying it's more scenic than other places, but it certainly is one of the classic locations for that type of landscape. The fourth resource is the Unuk River on the northeast corner. The Unuk River, more than any other of the coastal rivers in southeast Alaska, the major portion of it flows through the United States. It is a floatable river. It can be floated in an open canoe and it simply has more mileage, more of the river than the United States or the Stikine or the Taku or the Alsek.

It has a steep walled, U-shaped bottom gorge and Bob has mentioned the volcanic aspect at the end of it, Blue River. A combination of these four features in one area, plus the fact that the wilderness—small "w"—wilderness qualities of this corner of southeast are probably—oh, I hate to use the words, more outstanding—suffice it to say the acreage of unmodified lands in that portion of southeast Alaska exceeds that anywhere outside of Glacier Bay National Monument. The only place in southeast Alaska where you have a major navigation channel used by large ships is the East Beam Canal, which is entirely surrounded in every direction by nothing but wilderness. Thank you.

Mr. HARVEY. Thank you very much.

Mr. BEHNERT. Mr. Chairman?

Mr. HARVEY. Anyone else who wishes to comment on this area?

Mr. BEHNERT. With respect to the testimony given, I think the case could be made that many areas, both included within the areas delineated and those outside, could be described similarly. There is a great deal of landscape diversity, scenic beauty to be found throughout southeast. The question of choice as to which areas ought to be protected should be extended to consider all the areas that are to be looked at, insofar as trying to balance or make for a reasonable proposal. I would submit that the information about all of southeast should be taken into consideration, rather than just centering on this to the exclusion of all other. We're prepared to forward such information to you.

Mr. HARVEY. Thank you. Anyone else?

Mr. HAWKS. I'd just like to take a brief moment to tell you that we have compiled some reports on the fisheries, wildlife, recreation, timber and mineral potential of many of the areas that Rich and Bob Boddy mentioned, and I would like to submit them to your files.

Renewable Resources

Mr. HARVEY. Good, thank you. The second topic is renewable resources.

[NOTE: Timber resources were discussed in several statements addressed to the first topic for these areas.]

Mr. ALLINGTON. Mr. Chairman?

Mr. HARVEY. Yes.

Mr. ALLINGTON. I think that to tie the two together, in regard to the comments made earlier about no difficulties in placing the timber on West Chichagof/Yakobi, is an excellent example of what we are concerned with with the Native selections. The Forest service relocated the timber sale contractor from West Chichagof/Yakobi on the Kuiu Islands, and when that was accomplished, they then moved them into the Hoonah selection area, which was available to sealaska Corporation. Because of the press of time, the 5-year sale went ahead in that area, however, about half of that sale which was in the Sealaska selections has been agreed to by the timber sale contractor, Bernard Petit. At this present time, they are having a difficult time finding a place for the remaining cut to come out of that area and to replace that area, not to come out of necessarily, but it's in the total contingency.

This is a concern that we have and it's twofold. One, that there be room enough for the Native selections without counting on the Native selection timber to keep the present industry going. And second, there is some question as to whether the contingency provisions of the existing timber sale contractor really could not be used in order to allow the contractors to go back into the Native-selected lands and harvest timber in order to meet the Forest Service contract. This is a subject of an amendment that's being offered in the House right now, to H.R. 39, to clarify that issue because we thought it was clarified and it's slightly cloudy. But the total timber resource of southeastern Alaska has to be clarified and the volumes have to be there to meet the existing contractual obligations of the Forest Service, without obligating any of the Native-selected timber as far as the Native corporations are concerned. If they're not, then the benefit that the Natives of southeastern Alaska anticipated and which we believe Congress meant for us to have are going to be sadly diminished. The other part that comes in and on that same thing is the fact that Sealaska's timber is subject to revenue sharing under section 7(i) of the Settlement Act, which those of you on the committee I'm sure are familiar with. What we're concerned with on this aspect is what happens to the rest of Alaska, if the other corporations cannot produce 7(i) revenue? And we can, and we're going to put in more than our share into that pot for distribution, and I think that's not specifically just southeastern, but it has to do with what you do in Congress with the rest of the (d)(2) legislation can substantially affect us in southeastern.

The only other area of conflict that I'm aware of and I think the committee is, is the Dall Island area and I believe that that was discussed with late Senator Metcalf when the Sealaska and Klukwan amendments were offered and that that should be clarified, although I notice on the map that all of Dall Island is proposed for a mineral study area.

Mr. HARVEY. When you say it was discussed with Senator Metcalf, was that at a public hearing?

Mr. ALLINGTON. I believe it was in some private meetings with him, but I am not positive.

Mr. HARVEY. Okay.

Mr. ALLINGTON. The amendment to the ANCSA allowed us to select in the Klukwan withdrawal and that was discussed with him prior to the passage of that amendment.

Mr. HARVEY. I guess my question is directed toward—it's a suggestion to you, that based on your own judgment, whether you would want to make something a matter of public record.

Mr. ALLINGTON. My point was that I know that in the—as it's shown up there, was what was offered and it was just a clarification of the boundaries as they were offered.

Mr. HARVEY. Any other comments on this?

Mr. BEHNERT. I'd like to give a summation of what sort of annual potential yield could be obtained from the selection of areas that are displayed on the maps. If all the areas were to be proposed for some sort of wild land status and excluded from the timber base, the total amount of volume that would be foregone from the 22 or so areas that are included on the maps, it would amount to about 280 to 345 million board feet, that is the sum total. Looking at the areas that are shaded on the maps, which constitute the administration proposal, would amount to approximately 185 to 210 million board feet per year. Both these figures would be utilized in combination with other factors that reduce the total potential yield to figures that range in the 550 to hundred and 585 million board feet. A range—if we consider the administrative proposal alone—would be further reduced if we consider the total set of areas that are part and parcel of this proposal.

Mr. SILVER. How much of that would be special and how much would be standard and how much would be marginal?

Mr. BEHNERT. In the figures that are given for the administration proposal areas, approximately 292 million to 310 million board feet are considered standard. 172 to 188 million board feet are considered special, and 83 to 88 million board feet are considered marginal, again for a total of about 550 to 585 million board feet.

Mr. SILVER. That would be for special, standard and marginal timber for harvesting for the industry, immediately upon enactment; is that correct?

Mr. BEHNERT. That's correct, insofar as their prerogatives for choosing areas go. In other words, the strained nature of the resource base would force the utilization of special and marginal areas to maintain current levels of production. These are realities that are coming to be.

Mr. ZYLINSKI. Joe Zylinski, Forest Service. The information Mr. Behnert has placed before you is contained in the letters sent earlier to Congress.

Mr. HARVEY. We have that letter.

Mr. ZYLINSKI. Do you have that?

Mr. HARVEY. Yes, I have it.

Mr. BEHNERT. We have not worked out similar figures for the collection of units that are contained in the proposals here. Again, this is one portion of our responsibility, to assess the timber values along with other values, and I, personally, feel sort of cast in the role of having to address these things, to the exclusion of all others and it's not reflective of our interests in total. We do have interests in the wildlife, fisheries, minerals, watershed values, recreation values, the whole gamut of things and I'd like that to be known for the record.

Mr. HARVEY. Thank you. Does anyone else want to address the issue?

Mr. HAWK. I just wanted to address myself to Steve's question. If I understand, the Forest Service policy now and in the letter that the Forest Service sent, I believe, to Congressman Young, whether or not these wilderness areas designate it, it is not the policy of the Forest Service in region 10, out of necessity and in order to comply with the law, to substantially increase the harvest of special and marginal timber. The Forest Service has set a goal, independent of any land designations of 60 percent harvest of these components. I don't know in how many years, but I think that——

Mr. SILVER. That's the question. I mean, I don't want to get into the minerals or the selection and the timing, whether that should be done next season.

Mr. HAWK. Well, that's right, and it doesn't have to, you know, be done that quickly. You know, it's the next 5, the next 5 and the next 5 years. If you look at the areas that are in the legislation, they're mainly concentrated out of the highly timbered places in Southeast, except for Admiralty Island. North Prince of Wales, where the harvest has been concentrated for 25 years, is not really represented too extensively in the legislation. The Forest Service didn't bring their map that shows the timber values, so I don't see it on the wall. You can see exactly where the productive lands are and for the most part, the areas that the Alaska coalition is supporting are not in conflict with existing logging operations or at all in conflict, except in a few areas where the concentrations of standard timber lie in the forests.

Mr. BEHNERT. I'd like to respond to two points. One, the 60-percent figure that has been talked of previously and is now being entertained. It really is a figure that says that if, in the long run, we hope to maintain levels of production, given the estimated production and yields, that is the percentage that the industry would have to go to, is not a policy. It is a percentage that says, this is the amount of increase in special and marginal that would have to be accomplished.

Mr. HARVEY. And that does not imply that achieving that percentage would be consistent with the National Forest Management Act or any of the other laws relating to National Forests, or does it?

Mr. BEHNERT. Could you rephrase that?

Mr. HARVEY. I understand what you're saying is that they would have to go to the 60-percent level if certain timber was not available, and you said that's just simply a factual determination on your part, which I understand. Well, the next step is, is that simply a physical determination you've made or have you, in effect, also determined that going to that level would, indeed, be consistent with the policies set out by Congress in the National Forest Management Act of 1976 and the Multiple Use Act of 1960?

Mr. BEHNERT. Those would be consistent. It's a matter of adjusting and a matter of the time frame for that adjustment, and that has to do with the state of technology, the economics, et cetera, but, you know, it's a calculation that just approximates how far we have to go. The other thing with relation to the areas that are in conflict in the proposal areas, we did and analysis that relates to the map that was hanging on the wall, again, with regard to timber qualities and if you would draw your attention to the map, the areas that are outlined in red, orange, and yellow are the highest ranked areas in timber quality terms. If you look at the total spread of the areas that have been identified, 33 percent of the highest ranked units would be encompassed of the total forest, that is. There are 111 of those and the proposal areas would contain 37 of those.

Mr. HARVEY. That's of all the proposal?

Mr. BEHNERT. Yes. For the poorest ranking or the next to the highest ranking, 51 out of a 162 areas of the total would be included, or 31 percent. And for the third level or the moderate leve, 73 out of 205 or 36 percent would be included. But these are not insignificant inclusions and they do accomplish some of these high values. Again, drawing back to my statements earlier, the same areas also encompass high amenity values in like fashion, so there are inherent conflicts in terms of the proposals and we just want to make that clear.

Mr. HARVEY. For the record, we're just going to have to go on. Our Reporter has to leave at 6 o'clock, so we'll stay here after that, but we won't be on the record. Non-Federal lands, we've covered to a certain extent, Native selections in the discussion under the first two topics. Is there anything anybody wants to add to that? Yes, the State?

Mr. WALDROP. Right. As I indicated earlier, we had some selections on Admiralty in addition to those. We selected a total of 91 individual selections throughout Southeast and if I'm correct in my information as to the administration's proposal, 15 of those are in 5 of the 10 administration proposal areas. We have seven on Admiralty, which I mentioned earlier, three on West Chichagof, totaling 2,500 acres. We have one in the Stikine area, 242 acres.

We have three in the Misty Fjords area, 1,300 acres. One in the Tebenkof area, of about 2,300 acres. That's a total of about 10,250 acres, as a total of about 4.3 million acres that are within the withdrawals, as proposed for withdrawals.

Mr. HARVEY. Would you care to elaborate on why the State has selected those areas?

Mr. WALDROP. Those are selected for any one or a combination of the three reasons provided for in the Statehood Act: Community expansion, development of new communities and recreation. I can present you with a much more elaborate——

Mr. HARVEY. OK. In other words, they're all community purposes grants. I'm sorry, I didn't understand. So all these selections are within the 400,000 acres to be selected in the forests?

Mr. WALDROP. That's correct.

Mr. HARVEY. All right. I'm sorry, I forgot.

Mr. WALDROP. And I can provide you with a more elaborate description.

Mr. HARVEY. I'm sorry. I'd forgotten that they were of that character. Anybody else?

Nonfuel Mineral Resources

Mr. HARVEY. Energy and nonenergy mineral resources.

Mr. GREVENOVICH. Mr. Chairman, Paul Grevenovich, Alaska Miner's Association. The association would like to address just a very few number of the various areas under study here, including the Misty Fjords, Duncan Canal, Karta, Dall Island, Endicott, West Chichagof/Yakobi and to get those on the record, and I'd like to now call upon various individuals who have agreed to restrict their comments to 2 minutes. So we can keep this thing going, but I would also like to submit for the record a composite map of southeastern Alaska, showing the various areas we've discussed today, all of them, as a matter of fact, and some other Federal withdrawals, and major mineral trends and significant occurrences that are a matter of record. I'd like to submit that to you now.

Mr. HARVEY. Thank you.

Mr. GREVENOVICH. And call upon——

Mr. HARVEY. Do you want to say something before he starts? Go ahead.

Mr. HUGHES. All I wanted to say is, I know that you're going to cut off at 6. I was wondering if——

Mr. HARVEY. No; I didn't say that. I said we're going to go off the record at 6.

Mr. HUGHES. All right. Well, representing transportation, the most I have to say is in the areas outside of the areas already covered. Would you be willing to hear them tomorrow?

Mr. HARVEY. Go ahead. Oh, all right. Let's do that, let's do it tomorrow. Go ahead.

Mr. PILCHER. I'm Steve Pilcher. I'm district geologist with the Dow Corp. I've worked in Alaska about 14 years, the last 2 of which has been in southeast and during that time, we've spent about a quarter of a million dollars in exploration in southeast. We have some claims in the northwest part of the Misty Fjords area, around Burroughs Bay. They're located on this map, which I will submit for location. They were staked in 1976. We are in joint venture with Amax Exploration on them. Since 1976, we've done mapping, geochem sampling and geophysical surveys and based on our findings so far, we think the potential is very good for economic type molybdenum mineralization to be found and we have proposed a tentative $150,000 drilling program to test this potential. Let me also say than within the Misty Fjords in general, there are several known molybdenum deposits and the area in general has a very high potential for more of these to be found.

Let me make a brief comment on the Duncan Canal area, another area in which we have worked. The rock type and geology are very favorable in this area for volcanogenic type massive sulfide deposits. There is an operating barite mine on one of the Castle Islands. There are three known deposits in the area, one of which is known to be uneconomic, but two of which have not been—the potential has not been proven.

Mr. HARVEY. Thank you.

Mr. STEVENS. Mr. Chairman, my name is Jackie Stevens. I'm a geologist and the Northwest regional manager for U.S. Borax. U.S. Borax started exploration in southeastern Alaska about 7 years ago and started on the McLean Arm area, the Prince of Wales Island. In 1974, we made a major discovery of the Quartz Hill prospect. It's a large, low grade molybdenum prospect that we've been drilling for the last 3 years and we have outlined something like 200 million tons of 0.2, MOS_2 geologic reserves, and last year we drilled 30,000 feet to help indicate this. We intend on doing further exploration and drilling again this year and we're trying to follow up with all phases of exploration, leading to a mine some day, we hope.

We feel that it's a very, very significant deposit. It probably has reserves of something like 400 million tons of equivalent type mineralization and if we would go down to something like 1.0 MOS_2, we might have a billion tons. So this, in reference of porphyry molybdenum deposits of the world, has to be ranked as a very major and significant deposit. It's 5 miles inland from Wilson Arm and Boca de Quadra and is in about the south center of the Misty Fjords wilderness area. Yes, he's pointing it out on the map there now. U.S. Borax does not agree that wilderness and mining are compatible. There are no major significant mines of the world in wilderness areas, and we feel that we do have a very, very significant deposit and would like to have a chance to develop it. Thank you.

Mr. Harvey. Thank you very much.

Mr. Silver. What's the estimated life of the deposit and the labor force you anticipate using upon development?

Mr. Stevens. I'm a working geologist and I'm not a development engineer, but I think it's been guessed to be 20 to 50 years. It's a long-term operation and so it would be there for a while.

Mr. Silver. Thank you.

Mr. Kuhn. My name is Jack Kuhn, I'm associated with Inspiration Development Co., and vice president in charge of exploration. I've been a geologist, a superintendent and exploration manager for the last 20 some odd years. I'm here to discuss specifically Inspiration's interests on Yakobi Island and at Mirror Harbor. Mr. Frank Gordon has presented a map showing the interest for the committee. Inspiration has developed three separate deposits in this same area of Bohemia Basin. The reserves of ore minable by open pit are 160 million pounds of nickel, 16 million pounds of cobalt, 100 million pounds of copper. This is on the basis of 126 drill holes drilled by the U.S. Bureau of Mines, Inspiration Development Co. and Ingko through the years. To date, Inspiration has spent $2½ million in exploration of the Yakobi Island copper/nickel deposits. We have made a number of in-house feasibility studies. Our figures show that employment during production would be approximately 145 men, with a payroll of approximately $4 million per year. Our second deposit, Mirror Harbor, consists of 101 claims. It's on west Chichagof. We have drilled seven holes there, of which four have intercepted ore grade material. Unfortunately, we have done insufficient work in this area to calculate an ore reserve. Are there any questions?

Mr. Harvey. No; I don't think so, however, I'm struck by one thing when I hear about nickel, cobalt and copper and that is that our committee is presently considering legislation which would provide a Government investment guarantee for people who recover nickel and cobalt and copper from the floor of the ocean. I keep wondering what the tradeoffs are, as to whether we should do it at Mirror Harbor or provide an investment guarantee to get it off the bottom of the ocean floor off of Hawaii.

Mr. Kuhn. I would like to add one other comment. We have gone through this exercise a number of times with the Forest Service. If we got our area removed from their land use planning study, and we've gone through it with H.R. 8454, which was removed from there. S. 1180, so now we're trying one more time. How many more after this? I'd also like to point out, I have a nickel in my hand and I can say, categorically, that nickel was imported. Thank you.

Mr. Harvey. Thank you.

Mr. Turner. Mr. Chairman, my name is Tom Turner. I'm an exploration geologist and I'm employed by Noranda Explorations in Anchorage, Alaska. Last summer, I conducted a 2-month regional reconnaissance of the Prince of Wales Island to determine the economic potential of the area. The area I studied included Dall Island and Karta Bay. The information I have to give you is quite preliminary, because I've only worked down there one field season. To save time, I won't comment on the Karta Bay area, but would like to submit a written statement with this map. As far as Dall Island is concerned, to my knowledge of previous explorations and the present level of exploration activity, the area is virtually unexplored. From the rock types that I observed on the island this summer, I would have to conclude that there is an excellent chance that one or more volcanogenic massive sulfides may be present on the island and the area deserves to be explored further. That's it.

Mr. Harvey. Thank you very much.

Mr. Hinkens. My name is Dale Hinkens. I'm a prospector and a geologist. I've prospected in southeastern Alaska now for 14 years. My main area of interest is in the Endicott River area, which is a proposed wilderness. I have 20 claim groups here that cover about 728 acres, and from a previous drilling program, we've gotten some significant indication that there's a very large uranium deposit there. Based on our average assay of a 100-foot core sample, we were getting .022 percent uranium offside. That's about a half a pound per ton. Using that number and the outcrop area of the radioactive anomaly of 4,500 feet long, 1,200 feet wide and a known distribution from at least the top of this hill, at 1,850 feet to sea level, and using a constant of 11 cubic feet per ton of rock, we project a possible uranium resource value or potential of 883,636 million mineral tonnage there, that contains at that assay average, 399 million pounds of U_3O_8. Are there any questions?

Mr. Harvey. No, thank you. That's a lot of uranium.

Mr. Hinkens. I want to state that I think that that is a significant resource potential and this area should be dropped for consideration for further wilderness consideration.

Mr. Harvey. Yes; someone else?

Mr. Allington. Mr. Chairman, that completes our address on these various areas. I would like to say that we have kept it very brief, in the interest of time here, but all of us are available for any questions of your committee at any time, by telephone, in writing, and we will certainly do anything we can to assist you. Thank you for your time.

Mr. Harvey. Good. Thank you. We appreciate it very much. That's real fine.

Mr. Pittman. I'd like to present a letter to the committee, material on several of these areas which won't take any hearing time now.

Mr. Harvey. Thank you very much. Mr. Hughes, did you have something you wanted to add?

Mr. Hughes. This is the—all these other areas, these areas that most concern the Department of Transportation's current studies and I'd like to take the committee's time a little bit to go through them, but we don't have time now and I was wondering if you're receptive to allowing me to indicate what areas are of consideration that we're looking at and some of our——

Mr. HARVEY. Yes; Frankly, you've lost me as to what it is that you're talking about.

Mr. HUGHES. Transportation.

Mr. HARVEY. I understand. I mean——

Mr. HUGHES. Well, what—I'd like to discuss what—present to you what corridors we've found of interest to the residents of southeastern Alaska and what coordination we have had to date with the committee and their areas of interest, and indicate which corridors facilitate or have some facilitation in the construction of potential hydroelectric transmission lines and hydro sites and just give you a brief rundown.

Mr. HARVEY. OK. Can you submit that for the record? We'll try to fit it in. We can't do it this evening, but I'm not use we can do it tomorrow either. Are you going to be here tomorrow?

Mr. HUGHES. Well, I would make it a point to be here if——

Mr. HARVEY. I wasn't sure if you were going to be representing the department on the areas covered tomorrow.

Mr. HUGHES. No; I'm just Southeast.

Mr. HARVEY. OK.

Mr. BERG. Have you got 1 minute?

Mr. HARVEY. Yes.

Mr. BERG. Hank Berg, Geological Survey. I'd like to summarize what the geological survey's level II studies are showing in southeastern Alaska on a regional basis, using the same parameters I mentioned earlier for Glacier Bay. Southeast Alaska, geologically, a very complex area and our studies are showing, based on the known occurrences and on geologic terrain, that areas such as the Misty Fjords and Admiralty Island and areas of Chichagof/Yakobi are geologically permissive for at least one kind of mineral deposit type and in the case of Misty Fjords, as many as three. Areas on Karta, Dall Island, elsewhere, range anywhere from one to three mineral deposit types. Our studies are incomplete, but the geologic conditions definitely encourage permissiveness, in any case, for more than one type of mineral deposit in these areas. That's enough for now.

Mr. HARVEY. Thank you very much. Can you do it in 3 minutes?

Mr. HUGHES. No; Mr. Chairman——

Mr. HARVEY. Well, we can go off the—we'll have to go off the record and we'll stay here all night, if it takes all night. I have no problem with that.

Mr. HUGHES. Oh, no. I figure I'd need about 15, 20 minutes.

Mr. HARVEY. Well, I'm going to have a let the reporter go. She thought she was going to leave here at 5:30, so——

Mr. HUGHES. Well, I appreciate the situation.

Mr. HARVEY. But you go ahead, you're on.

ALASKA NATIONAL INTEREST LANDS WORKSHOPS

TUESDAY, FEBRUARY 14, 1978

ANCHORAGE, ALASKA

THE SOUTHWEST REGION

Mr. HARVEY. I'm going to ask Dick Stenmark to give us a little background information on this area and kind of define our terms as to what we're talking about here. I would remind everyone again that we are interested in looking at all the areas that have been included in any legislative proposal that's pending before the Congress, as well as getting information about areas that are not included in the proposals, that someone thinks perhaps should be included.

Mr. STENMARK. I'm Richard Stenmark with the Federal and State Land and Planning Commission. Southwestern Alaska, for our purposes here today, will consist of the area north of Bristol Bay, the area around Iliamna Lake, but not including the Lake Clark area. All of the Alaska Peninsula, the Aleutian Islands and the Kodiak Island group. This is an area of about 32 million acres. It has fewer than 25,000 people. Kodiak is the largest community, with a population of about 5,000 on Kodiak Island. The area consists basically of coastal plain, a little bit around Dillingham and the upper Bristol Bay area or the mouth of the Kvichak River and then on down the western side of the Alaskan Peninsula. As you know, the Alaska Peninsula is several hundred miles long and then the Aleutian Chain Stretches out another nearly 1,200 miles beyond this point. Besides these coastal plains I mentioned, then there are mountains up above Bristol Bay, as well as along the eastern side of the Alaska Peninsula, studded with active volcanoes and then this mountain chain is manifested on westward in the islands of the Aleutian Islands. Kodiak and Afognak Island also are quite mountainous. The predominant vegetation of this region is tundra and brush. There is some forest up in the northern end. The interior spruce forest extends down into somewhat this area and then there is a western and southern tree line here and the break comes across in Katmai. Also the coastal spruce forest at this point comes down a little bit at Katmai. Afognak Island is fairly heavily forested and then the termination is in northern Kodiak.

The climate is moderated in this region somewhat by—in temperature, by the ocean, so it's a little warmer as far as temperature readings go, than some of the country to the north, but strong winds are fairly common and rains are fairly heavy in places. No roads extend into the region and access is by air or water. The major industries in the region are commercial fishing, tourism and recreation, some timber harvest, mostly on Afognak, some grazing of reindeer, such as Hagemeister Island, and a little bit over in this area, some sheep down in some of the Aleutian Islands. Near the northern end, and some cattle primarily on northern Kodiak Island. Existing Federal Reserves in this region include Afognak Island, which is a separate part of the Chugach National Forest. Katmai National Monument, at the head of the Alaska Peninsula, then there's several wildlife refuges. Most of the southern part of Kodiak Island is a refuge. The other refuges lie somewhat further south. Semidi is south of the east coast of the Alaska Peninsula. Simeonof and Izembik are north of its west coast. Unimak is actually a Izembek part of the large Aleutian Islands refuge but is the largest island in that particular group and one smaller refuge down in this area is Bogoslof. Also Walrus and Otter Islands over in the Pribilof Island group are part of the wildlife refuge system. In addition, some of the critical habitat in the Pribilof Islands is also reserved by the Federal Government for management of the northern fur seal.

Now, the national interest lands focal points that we want to deal with today are first the—well, the first one we're going to do will be the offshore islands and I'll come back to that in a minute. But on the mainland will be the so-called Togiak/Cape Newenham area, and this will include the area around the existing Cape Newenham Wildlife Refuge, as well as the country northward containing the Kanektok River and going eastward and adjoining the Wood-tikchik area.

The next area would be the area around Iliamna Lake, and some of the lands traveling the Nushagak River. The Katmai area, lands both south and north of that area. A little further down the Peninsula would be the Aniakchak area, and then all of the lands from the Becharof Lake along the Peninsula south, down to the end of the Peninsula at False Pass, all the Federal lands in that area. The offshore islands I mentioned in this area particularly are mostly the Shumagin group along in here, Sandman Reef, various scattered islands all the way up here to near Puale Bay. There's some wilderness areas also that come under some of the legislation proposed, besides the areas we've just mentioned, that would be a wilderness proposal for refuge lands at Kodiak. Semidi would come under this—actually the rest of these, for the most part, would come under the Alaska marine resources proposal which is divided into five administrative units, but there are a couple of them prominently in this area. One would be those islands lying offshore to the Alaska Peninsula, the existing Aleutian Islands group, and let's see, well, including Unimak Island here, and then another wilderness proposal would be at the Izembek Refuge. That concludes my remarks.

COASTAL ISLANDS AND THE ALEUTIAN CHAIN

Scenic, Landscape, Historic, and Archaeological Values and Wildlife and Fish Resources and Uses

Mr. HARVEY. Thank you, Dick. Let's turn first, as you mentioned, to this offshore island area and our normal first topic is scenic, landscape, historical, archeological values. I think we ought to jump right into it with regard to the wildlife values at the same time, since that's what we're really dealing with here, and I think I'll let the Fish and Wildlife Service kick this off.

Mr. BARTONEK. My name is James Bartonek. I'm with the Fish and Wildlife Service. Discussing the scenic values of the various offshore island and rocks, and we must include the headlands, just as with any coastal aspects, they're very spectacular. The majority of the locations that we're describing here that are used by marine birds and mammals are somewhat remote, relatively inaccessible to people and that's the primary reason why they are used by the wildlife. Looking at a scenic value of a place like a marine bird colony, unless you can add the dimension of sound, whether it's birds or the sea lion roaring, it's—you can't really descibe it, because it's a many-dimensional experience. I'd like to discuss marine bird colonies as a whole, and the marine mammal hauling grounds as a whole, because then I think you can see some of the relative values of each of these areas. Starting up in the Chukchi Sea, Cape Lisburne is the northermost cliff nesting colony of marine birds within Alaska and as far as that goes, North America. Essentially, along the low-lying coastal plain of the Arctic coast, there are a few small colonies of terns and gulls, but essentially at Cape Lisburne and heading south are where we find the predominant number of birds and likewise, as you'll be able to see on this map, some of our mammals.

Now, the size of the circle indicated relative numbers of the marine bird colonies. This largest one is over a 100,000 and the smallest dot that we have here would be less than a 1,000. We're very aware of how imprecise our information is on some of these colonies, so they're only relative orders of magitude. A colony such as this at Cape Thompson, which has been studied a long time, has fluctuated at least two to threefold within the 10 years, so when we speak of colonies in excess of a million birds, that could very easily be plus or minus a half million, depending upon what circumstances are affecting the population. Essentially, the largest colonies in the Chukchi Sea are those at Cape Lisburne. The better known colonies at Cape Thompson are located below Point Hope.

Coming down into Kotzebue Sound, we have a national wildlife refuge, Chamisso, which is not one of the larger colonies. There are scattered colonies along the north side of the Seward Peninsula. Moving along here, we come in again to the coastal lowlands, which is not conducive for cliff nesting marine birds. Probably some of the largest colonies are those in the Bering Straits, one on the Soviet Big Diomede Island and the other on our Little Diomede Island. There are scattered small colonies along the coast. The next largest one is on King Island and we have smaller ones on Sledge Island and the headlands at Bluff, Cape Darby, Cape Denbigh, Egg Island, these near Stewart Island, and Saint Michael. The largest colonies for the northern part are on Saint Lawrence Island, and these are some of the better studies colonies. There are smaller ones on Punik Rock and Stolbi Rock.

This is an existing national wildlife refuge, Saint Matthew and Hall Island. It's known as the Bering Sea Refuge. These dots were based upon the best information available at the time the map was constructed, which was sometime this spring, but recent surveys indicate that the populations are well in excess of a million birds on Saint Lawrence. Coming down the existing wildlife refuge at Nunivak Island, there's a large colony that was described yesterday, at Cape Mohican. There are lesser colonies on the outcrops on the Youkon Delta. Probably the largest colonies in North America occur on Saint George Island. There are two small refuges on Walrus Island and Otter Island, but numerically the bird populations are minor in comparison to the population on Saint George and there are many birds, but perhaps only a third to a fourth of that on Saint Paul. The unique population on Saint George, I think, would be the redlegged kittiwake, which nest, to the best of our knowledge, in only four other locations. One of them is on Bogoslof Island, where there's a population of posssibly 500 redlegged kittiwakes. Another is on Buldir Island, where there may be about 2,000 kittiwakes, and the other is in the Commander Islands in the Soviet Union, where there are probably under 10,000 birds. So probably a good 90 percent of the world's redlegged kittiwake population nest on Saint George and a few on Saint Paul, so it is very significant. Coming into the northern side of Bristol Bay, the headlands there rise precipitously out of the sea and make them relatively inaccessible for such mammalian predators as fox to get to the birds, so the Cape Newenham, and Cape Pierce area, are extremely important to birds and probably have over 2 million birds of at least 55 species that could be regarded as marine in nature.

The State-owned Walrus Island game sanctuary is another extremely important marine bird region within the Bristol Bay proper. There are very few and scattered colonies along the north side of the Alaska Peninsula. Coming down to—Well, essentially, Cape Seniavin, a few scattered colonies in Port Moller. Coming down off of Izembek, there's Amak Island, extending out to the Aleutian. This, I would day, represents a poorly defined marine bird population. I'm certain that with more precise information, we would be able to put a lot more dots on the map. But looking at the south side of the Alaska Peninsula, this and extending and extending around coastal Kodiak, this represents some of our major marine bird habitats in the State.

There are very few colonies found within Cook Inlet, although the Tuxedni National Wildlife Refuge, perhaps, has one of the major kittiwake colonies. There are other colonies located within Katchemak Bay. Coming along the south side of the Kenai Peninsula, there are scattered and very significant colonies and a few within Prince William Sound. There's one major colony on Middleton Island, sticking out in the Gulf of Alaska and extending down the coast. Either we don't know much about the marine birds of the coast, which is in part it, but I think it just represents that there are fewer colonies, but the ones that are there are very significant. This last one here is Forrester Island, which is a national wildlife refuge and it, perhaps, represents the northernmost major stronghold of one of these 55 species, the rhinoceros auklet. There are only about 100,000 birds there, however, 2 birds that have much wider distribution than that bird are the fork-tailed and Leach's petrel, together, numbering about 1.2 million birds on a small island that's only—Petrel Island, it's appropriately named, that's perhaps only 20 acres in size.

Looking at the marine mammal distribution, this red dot indicates the northern fur seal, which principally—well, it is found only on the Pribilofs. The little blue dot indicates major terrestrial hauling grounds for walrus and it would be in the Diomedes, King Island, Sledge Island, Punik Rock, Besboro Island. These are islands that have had a tradition for hauling grounds and they may or may not be used as such by the walrus today. On Hall Island in the Bering Sea, off of Nunivak is a very important hauling rounds and in the Walrus Island group of State lands.

The red triangle indicated distribution of major harbor seal hauling grounds and sea lions are represented by these large purplish circles. In essence, while you find marine mammals and marine birds around much of te coast, as you might expect, you find certain species only in certain locations. So while you may have many large dots, each does not represent—each cannot be of a comparable, equitable value, because in one location we may have certain species dominating the population.

Looking at other coastal resources, this represents the distribution of peregrine falcon. The Peale's peregrine falcon, which is one of the nonendangered races of the peregrine, and perhaps numbers in the thousands of birds, unlike the peregrine falcon of Interior Alaska, which probably numbers in the hundreds of birds. The key habitat listed is red. The high density in brown, the medium in orange, and the lower densities in yellow. Now, there's a close association of the Peale's peregrine falcon and the marine birds, which are one of its principal prey and it's just a commonly expected association. This other one represents the bald eagle habitat within Alaska, again, a gradation of the red being the highest value and yellow being the low density and while we have bald eagles in other portions of Alaska, they tend to be the exception rather than the rule. They, like the other raptors, are dependent upon the marine resources of the area. The eagles feeding primarily on fish, but secondarily on birds and mammals of the area. That's the end of my statement.

Mr. HARVEY. Thank you. Does anyone have any comments on this?

Mr. HANSEN. Yes. Dave Hansen, Department of Natural Resources. I'd like to ask a question just on what differences there are in the coastal wildlife proposals, based upon your maps. Just not in detail, but generally. For example, is the Udall proposal for coastal wildlife maring sanctuaries about the same as the Morton proposal, about the same as the Andrus proposal or are there big differences between these?

Mr. BARTONEK. I thing maybe Bill Reffalt would be better to ask that. I'm perhaps more aware of the resources and less aware of the individual proposals.

Mr. HANSEN. I guess the followup is, is that the Andrus proposal that you just outlined?

Mr. BARTONEK. No, I described the resources without respect to any proposal.

Mr. HANSEN. OK. Thank you.

Mr. REFFALT. I can't precisely tell you what the Udall proposal is today, Dave. As you know, we're still trying to work that out with the committee.

Mr. HANSEN. I'm just wondering, in general.

Mr. REFFALT. In general, the Udall proposal and the Andrus proposal are quite similar. They both have about 400,000 acres of lands other than existing National Wildlife Refuges around the coast of Alaska that would be placed in marine or maritime or coastal, whatever their title might be, National Wildlife Refuges. There's a great deal of similarity. Most of them deal with any and all offshore federally owned islands that are not otherwise claimed under the Native Claims Act or under the Statehood Act.

Mr. HANSEN. Thank you.

Mr. GORDON. Mr. Chairman, I have a comment on that. There are three differences—two of which are rather minor, between the Udall proposal, which is reflected in the House Subcommittee Print No. 2 and the Andrus proposal. No. 1, that the northern end at Cape Lisburne, the Andrus proposal simply includes the coastal bird cliffs. The Udall proposal includes about four townships, still quite a small acreage, to include the westernmost tip of an outlayer of the Brooks Range. Within those four townships, you have an entire mountain range, the Lisburne Hills, which rise to over 2,000 feet very abruptly. The object, where you have such a very compact physiographic feature bordering the cove, and as far as I know it's public land, not selected by the Natives, to include that entire topographic feature, particularly since there's no other representation in that part of the State of any complete physiographic units.

The second difference is Middleton Island. There is a FAA station on Middleton Island and as a result, it is not (d)(1) unreserved Federal lands. House Resolution 39 proposes that Middleton Island be included in the refuge and there is a great deal of precedence for this, since many Fish and Wildlife Service refuges overlap lands which are used for particular purposes by other agencies. As Mr. Bartonek indicated, there is a significant colony, somewhere probably between 10,000 and 100,000, of sea birds, primarily kittiwakes, murres, and puffins and also, on that particular island, because of the fact that is is rather flat, there is a reasonably or at least slightly protected anchorage. You can get in there by small boats much more easily than many of these other refuges and I've done it. Also there is a significant nesting of shore birds, wading birds, on the flatter portions of that island. The major difference is one of concept more than lines on a map. House Resolution 39 and the Subcommittee Print No. 2 includes all waters to 6 miles offshore of all of these bird colonies. This is based on Fish and Wildlife Service studies, which I think Mr. Bartonek could discuss, which indicate the use of the waters offshore to about 6 miles in more significant by sea birds, particularly, than the use further offshore. The proposal does not intend in any way to conflict with Coast Guard authorities or State land selection, and I might comment that the Morton proposal also included that. We feel it's a very, very important part of the ecosystem for these birds and mammals. Thank you.

Mr. HARVEY. Thank you. Any others?

UNIDENTIFIED VOICE. Do you know what the status of the Punik Islands off St. Lawrence Island is? Are they in the Udall proposal?

Mr. GORDON. Yes, as they are in the Andrus proposal.

UNIDENTIFIED VOICE. They're not listed there.

Mr. GORDON. Well, in that case, somebody made a mistake, which is not impossible.

Mr. HARVEY. Are there any comments on this issue?

Mr. GORDON. Yes. I want to followup again, just to emphasize the complexity of the proposal and the difficulty in understanding it. According to our records, there do seem to be some significant acreage differences between the different proposals and that's why it's hard to deal with. We have the Udall proposal that he originally set forth as including 332,000 acres. The Morton proposal only including 86,000 acres, which is quite a difference in growth there over time. The Stevens proposal including 146,000 acres and the Land Use Planning Commission proposal including 186,000 acres. And I just throw that out to emphasize that——

Mr. STENMARK. Are you telling us you can't explain the difference?

Mr. GORDON. I would, with time, actually—but I would have to go back and look at a couple of computerized maps to see the difference, but we will——

Mr. STENMARK. In other words, you're saying those are real differences.

Mr. GORDON. Those are real differences. In other words, there are big area differences between the different considerations that have been set forth for marine refuges.

Mr. STENMARK. I may be incorrect, but I think largely the discrepancy is that nobody has a good handle on the acreage on all of those various islands and that's where the discrepancies are. It's very difficult to count up the acreages because of the irregular shapes. I think we're all talking about the same lands pretty much, but I don't think the acreage differences are a big issue there.

Mr. REFFALT. That's basically true. The additional differences would be if you try to take the Morton proposal of 1973. There would be substantial differences there, because there was a policy within the Department at that time that there would be no inclusion of any lands withdrawn for Native selections as of 1973, which greatly reduced the amount of land that could be placed in that proposal at that time. In 1976–77, when Mr. Andrus looked through the proposals, most of the selections had been made, and unless there were selections on the land, they were allowed to be placed back in the proposal, which built it back up again. The environmental impact statement, though, does describe about 400,000 acres, which is an approximation, because the islands have never been surveyed.

Mr. HARVEY. OK. Did you have a question?

Mr. FIELDS. Ed Fields with the Alaska Miner's Association. Could you comment on the adaptability of, say, the coastal bird population and the mammal population, if they were, say, moved to a new site, a new comparable site 10 or 20 miles north, just looking into some area that was established there and they had to move to a comparable habitat? Are they able to adapt readily?

Mr. BARTONEK. The habitat would probably already be occupied by birds if it were suitable. Not knowing whether the habitat is occupied to maximum capacity or not, the factors affecting population dynamics are more related with the marine environment, which in part I suspect causes those fluctuations that I had mentioned, I suspect birds would not move to another locality. We have very confusing things, such as tradition, and birds that are reared in a location oftentimes will return only to that location to nest. If the population becomes saturated, all of the nesting sites filled, then they will expand out into other areas, they'll be displaced. I would suspect that if the habitat were eliminated, that population, through attrition, would eventually disappear. It would not just move in and occupy new habitat elsewhere.

Mr. HARVEY. Does anyone else have any comments about the values there, use patterns? Go ahead.

Mr. SOMERVILLE. Yes. My name is Ron Somerville with the Alaska Department of Fish and Game. I'd like to point out that we have submitted in this particular area, fairly extensive background information on some of the other values that haven't been mentioned here, commercial fisheries, game. We've submitted all these documents to Mr. Quarles here about 2 weeks ago, so I would like those entered officially in the record. I'd also like to take just a couple of minutes to ask the Game and Commercial Fisheries staff to point out some of these other values. There are some severe conflicts and I think the committee should address those.

Mr. FERRILL. My name is Jim Ferrill, with the Alaska Department of Fish and Game, and first I'd like to address the marine mammal issue, which has already been discussed briefly. The State has requested and petitioned for return of management of the marine mammal species. At this time, I don't know when we'll be getting them back or not, but I'm working on the assumption that we will. Under the Marine Mammals Act, the only harvesting of these marine species which is occurring at this time is basically by Alaska natives and primarily for subsistence. We assume that with the return of management, these marine mammal species will once again be harvested as they were in the past. This will allow for commercial harvesting. A development which could occur in this land classification could be accomplished with the commercial harvesting here in the future.

Mr. HARVEY. How would that be? Could you explain that?

Mr. FERRILL. It might be that access restrictions would be such that a commercial harvester would be unable to effectively get in and actually harvest a population of animals, sea lions, say, perhaps. You might be not allowed to get onto the rookery, due to a Wilderness designation or something like this. The Tidgituk Island, where they use motorbikes and stuff like this, as a means of transportation in the harvesting of seal pups. So there is a possibility that it could conflict with the commercial harvest. The species we're talking about commercial harvesting here would probably be harbor seal, which prior to the Marine Mammals Act were a fairly valuable item on the fur market, the sea otter, which prior to the Marine Mammals Act was just starting to be harvested again under State contract and the first furs had been sent to the fur market for developing, and sea lions, which were also in an initial stage of developing for commercial harvest.

In addition to the sea birds which have been discussed, there are terrestrial game considerations which also should be considered. Adak Island has an established caribou population on it and this is hunted primarily now recreationally. It was established by the State and the Federal Governments, primarily, to provide a species of animal as a meat animal and a recreational animal for the U.S. Navy base on Adak. Access to that island right now is primarily by boat, coming around. The island is essentially managed as a wilderness and hunters have to either hike or have a boat available. The herd is extemely inaccessible and we are having difficulties maintaining the harvest level that we need on that herd of caribou to keep it from expanding to the point that it could eventually do damage to the range. They are trying to hold the herd at about 250 animals and no larger.

The second island with a very significant game population is Unimak. It has both brown bear and caribou. These are hunted primarily by recreational hunters. There is a very little bit of subsistence hunting, which occurs from the village of False Pass. Virtually all the remaining harvest area is by recreational hunters. The island is lightly harvested, because access to it is a problem. The only place aircraft essentially can land, besides a couple of landing strips, are on the beaches of the intertidal zone. That's basically what I have to say about the major big game species which are available in these islands.

Mr. Hansen. Can I ask a question that I guess should be addressed to the Fish and Wildlife Service, as well as yourself? Oh—just as a point of information, as far as what our concern is. On refuges that are not designated wilderness areas, the type of hunting concerns mentioned here can continue, is that correct or not correct?

Mr. Reffalt. They would be allowed to continue unless there was a problem with the population, say.

Mr. Harvey. There's hunting in wilderness also.

Mr. Reffalt. The access can be restricted. That's true. Wilderness designation has no effect on hunting. It has more severe effect on access or motorized vehicles, but even in a National Wildlife Refuge, if motorized vehicles were causing a problem to the manager, he could restrict them. I don't think that we have in too many instances, but it could be done and I think that's what he was referring to there.

Mr. Hansen. Referring to the possibility.

Mr. Reffalt. I would like to ask a clarifying question of Jules Tileston of the Bureau of Land Management. Under the BLM Organic Act, Jules, would you see at this point in time any significant difference really in possible restrictions of—in the future, of these lands if they remain in just general public land, as far as some of the things that Mr. Ferrill brought up?

Mr. TILESTON. Jules Tileston, BLM I really don't know, because we haven't been looking at the resources to know really what the values are or what the conflicts might be. I'd have to turn around and say to you, what are the conflicts?

Mr. REFFALT. Well, as I said, my point I think there is that under the BLM Organic Act passed in 1976, the same kinds of restrictions, wilderness classification and study, and so forth, is going to take place on the lands, regardless of whether they're designated in a refuge or whether they remain public lands, is that correct?

Mr. TILESTON. That's substantially correct, yes.

Mr. HARVEY. Anyone else want to comment on wildlife values and uses? Yes.

Mr. CURTIS. Which one?

Mr. HARVEY. Either one.

Mr. CURTIS. I'd like to ask a question. This is Bob Curtis, Alaska professional hunters, and regarding the refuge that is at Cold Bay right now, if that were to be made into a wilderness area, what—would the refuge rules apply or would the wilderness areas apply or just exactly what? They allow outboards, for instance, there now.

Mr. REFFALT. The establishment of a wilderness in a national wildlife refuge does not, of itself, preclude the continued use of established transportation systems such as outboard motors. If that use has been a well-established practice in the past and it's placed in the wilderness system, the recommendation is usually made in the proposal to the Congress that the motorboat use will be continued. In the proposals that were made by Secretary Andrus, for instance, motorboating and airplane landings in these wilderness areas would be allowed to continue. So I would think that it wouldn't affect you in this instance.

Mr. MIDDLETON. Yes. My name is Ken Middleton, with the Alaska Department of Fish and Game. I did want to briefly mention some new commercial fisheries endeavors in the Norton Sound, off the Nome area, in particular. For instance, in 1977, there was a near-shore 500,000 pound king crab fishery developed. The National Fisheries trial survey, just recently conducted in the Sledge Island area, indicates a 1½ to 2½ million pound harvestable surplus of king crab in that area, with a total population magnitude of 10 million crab. There's a brand new winter fishery near shore, very near shore, practically on shore fishery in Nome that just started up about a week ago. We don't have any data on that particular fishery at this time. There is a subsistence fishery again very near shore in the Nome area that annually takes 10,000 to 20,000 king crab. There's a potential herring fishery for all of Norton Sound in the areas of Sledge Island, Bluff, Egg Island, Besboro Island, on the order of 500 tons. Traditionally, Japanese have taken something like 1,200 metric tons of herring in the—off of the Norton Sound area. I would like to mention——

Mr. HARVEY. Is this use in any way impaired or do you think it would be by these proposals?

Mr. MIDDLETON. I'm not certain of that, personally. Perhaps other people here could address that question. I did want to make one other comment, that we have throughout most of the Aleutian Islands, South Peninsula areas, Shumagin Islands and so forth, there are extensive and traditional commercial and subsistence fisheries, both fin fish and shell fish.

Mr. HANSEN. On a statewide basis, the 332,000 acres that we would count, that are included in the total proposal area, over half of this acreage is rated in the second 10 percentile for wildlife habitat, which on statewide basis makes it very significant. All of it is in the top half of the State for wildlife habitat, which is backed up with what I think everybody has been saying.

Mr. TILESTON. Jules Tileston, BLM. I'd like to clarify one thing for my own information, it deals with a question that we were just asked a minute ago. As I understood it, the committee is seeking information on resource conflicts, not agencies. If that is, in fact, the issue was: Does wilderness impact this and is it real or not? and that was the issue, not who handles it if it's wilderness, and I just wanted to clarify that, because this question could have come up yesterday on a similar vein on timber, and the question is not who harvests it, but whether they harvest it.

Mr. HARVEY. That's right. That's absolutely correct. Yes?

Mr. SOMERVILLE. Yes. Ron Somerville, Alaska Department of Fish and Game. We have identified and will submit on a statewide basis, the aquaculture sites and enhancement sites for fisheries. There are some conflicts in the Aleutians, which we think would be precluded by the Wilderness Act, which would not allow these types of activities to occur, and I just want to point those out. Also we feel there's a couple parts of the Wilderness Act, which out attorneys have questions of whether they would be allowed. One, commercial enterprise. There's a paragraph in there that says commercial enterprises will not be allowed in wilderness areas. In addition, preestablished uses have to be treated in every wilderness area that's established. In other words, if you don't, say, preestablish the uses, like Mr. Reffalt pointed out here, we feel that they would be precluded. But again that's just our interpretation and at least we'd like for you to treat that. We are concerned with the jurisdicational problems with the extension of the boundaries 6 miles seaward, and I think you can understand from the Statehood Act, territorial waters aspect, we're concerned about commercial fisheries particularly.

Mr. BEVINETTO. When you say territorial waters under the Statehood Act, you're referring to the grant of submerged lands?

Mr. SOMERVILLE. Submerged lands, yes. Two or three miles. Yes, 3 miles.

Mr. REFFALT. Not the water.

Mr. SOMERVILLE. That's right. That's all I have.

Mr. HARVEY. Are there any other comments?

Mr. REFFALT. I'd like to just make one small point. We already have two of the refuges in the Alaskan waters with offshore boundaries. The Nunivak National Wildlife Refuge has an extensive offshore bundary, including submerged lands, and the Simeonof/Semidi group has offshore boundaries, and as far as I know, there has been no conflict in commercial harvest. In fact, Simeonof, I believe, is the one that has gone into the wildeness system as of last year, is that correct?

Mr. BEVINETTO. That's correct.

Mr. REFFALT. So far, there has been no major conflict there.

Mr. BEVINETTO. I have two questions for Ron. No. 1, would you describe the nature of the enhancement for the aquaculture development.

Mr. SOMERVILLE. I guess I would probably call Mr. Baker to be more specific, and we talk about actually three parts to what we're concerned with in the wilderness areas. One in continuous fisheries research, like Weir's, things that may be needed for population enumeration, this type of thing, and the enhancement might include stream improvement, going in with artificial means of improving stream beds or something like this, for egg sites. We might put in some egg boxes or something like this, to imporve production in a particular stream. Those are the types of enhancement. Aquaculture, fisheries aquaculture obviously is more on saltwater rearing or actual hatchery sites that might be constructed in a particular location. A good example, I think, where this has been successful is Prince William Sound, where after the earthquake of 1964, we had extensive damage to our fisheries, which through the F.R.E.D. division and the commercial fisheries, they were able to reestablish those programs. Had we not been allowed to recoup from that, we would have many streams down there which would be nonproductive today.

Mr. BEVINETTO. The second question. In the data you provided for Mr. Quarles, were there estimates of the populations of the marine mammals and data on the harvest rates, comparative data between the two?

Mr. SOMERVILLE. Yes; there is. We provided on each rookery, our population estimates for marine mammals. We've provided historical data on harvest on all species. Of course, since 1972, there's been essentially no harvest on marine mammals, except for subsistence.

Renewable Resources

Mr. HARVEY. Does anyone have any comments on other renewable resources—agriculture, timber, livestock?

Mr. HANSEN. Just for the record, a point of information. The State assessment doesn't find anything of enough significance in either the area of agriculture or forestry in the marine refuge system that's proposed to even register.

Mr. HARVEY. Any other comments on that? Yes.

Mr. EATON. I'd like to ask just one question in regard to the subsistence on this area of birds.

Mr. HARVEY. Would you identify yourself?

Mr. EATON. My name is Hank Eaton. I'm from Kodiak and with the Koniag Regional Corporation. Birds and their eggs are used by the Natives quite extensively for subsistence. Seagulls, murres, whatever and, in fact, young seagulls are quite a delicacy, if you ever want to eat one. But I see nothing in anything that these gentlemen have said here in the last half hour or so to indicate that there are going to be provisions made to allow the continuation of the use of these birds and animals in the wildlife areas as they're described by you people.

Mr. **Harvey**. Do you want to respond to that?

Mr. **Reffalt**. Bill Reffalt, Fish and Wildlife Service. The allowance of the taking of certain marine birds and their eggs and so forth, under the Migratory Bird Treaty Act, would be unchanged; some of the other allowances that are made in other laws are sort of outside of the (d)(2) concept and the Wildlife Refuge proposals. Within all of the bills that are being discussed here, there are also separate subsistence provisions and we haven't gone into that, and that's the only reason it hasn't been brought up. This could be discussed if you wish to do so, but it gets quite complicated. Suffice it to say that we have not made a proposal that would in any way change the existing subsistence patterns or uses on these areas.

State and Native Land Selections

Mr. **Harvey**. Any other comments on that? On the non-Federal Lands question, State and Native selection issues, does the State have any comments first?

Mr. **Hansen**. Dave Hansen, State of Alaska. We have—we currently have only about 5,000 acres that fall in the refuge—marine refuge areas. The Native corporations have selected 121,000 acres in this area. They have selected nearly a third of the land area to put into refuge.

Mr. **Harvey**. Gentlemen, do you have any comments on that issue? Yes.

Mr. **Epps**. Alan Epps with the Cooperative Extension Service. I might mention that in conjunction with these Native lands, there is considerable interest in a number of the communities, pariticularly out on the Aleutian Chain, in getting into some sort of red meat industry, whether it happens to be reindeer, cattle or sheep. Here again, we come to the ability to be able to utilize the entire range if possible. This is one of the few areas in the State of Alaska where we, potentially, could have year round grazing of this area, animals.

Mr. **Harvey**. Yes, go ahead.

Mr. **Hansen**. Dave Hansen, Department of Natural Resources. I think most of that area does not fall within the marine refuges, but will be in the national—Aleutian and Alaskan Peninsula chain.

Mr. **Harvey**. That's correct.

Mr. **Hansen**. The second point is, I would like to comment quite strongly that the State feels very strong about its rights to the submerged land within the 3-mile limit around these islands, and this is just an issue of potential conflict, depending upon how a Marine Refuge Act would deal with the issue of the State-owned submerged lands. We obviously feel quite strong about our ownership of it.

Mr. **Harvey**. I understand.

Mr. **Hansen**. Thank you.

Mr. **Reffalt**. Bill Reffalt, Fish and Wildlife Service. We have a brief statement here on the archeological, historical and as related to that, some of the Native selections under section 14(h) of the act. All historical and cemetery sites, scattered throughout the island groups, have been selected. I think it would probably be best if I made copies of this and just submitted it—but there is a very distinct and very substantial archeological and historical record on many of these islands and depending on where you are within the island areas, whether it's out in the Aleutians or wherever, they have a very long history. Some of the archeological sites out there are some of the oldest known in Alaska.

Mr. HARVEY. Very good. Yes, Jules?

Mr. TILESTON. Jules Tileston, BLM. Just clarification, Bill. Are those lands that you're talking about on 14(h) actually withdrawn under (d)(2) or are they available and will be transferred to the Native ownership? In other words, you've got an acreage figure floating around. Does that include 14(h) going into private ownership?

Mr. REFFALT. I wish we could get that answer from the folks that are supposed to give us the answer. All we know is that all sites have been filed for, Jules, and they haven't been that carefully identified, as far as I know yet. Many of them are in areas that can be, some of them may not be, but that will be up to your agency.

Energy Resources

Mr. HARVEY. Are there any comments on minerals, energy or non-energy? Yes, Dave?

Mr. HANSEN. From the standpoint of the energy resources in this area, there have been identified somewhere in the range of 117,000 acres that have some type of oil and gas potential. Most of this potential has been ranked in the ninth ten percentile. In fact, 111,000 of the 117,000 acres. There is also recent information that there are some oil basins near the size of a Los Angeles sized basin between certain of these islands, especially as you get into the chain of islands, and it's unknown at this time how—exactly what that potential is. It's my understanding that it is mainly submerged.

Mr. HARVEY. Thank you. Would you care to comment?

Mr. SISSON. Alex Sisson of the Alaska Oil and Gas Association. Concerning the offshore islands, the main interest that the oil and gas industry would be concerned with would be islands such as the Pribilof Islands, the south portion of the islands along the Alaska Peninsula, Shumagin Island, and so forth. These areas in themselves have a low—probably a low potential as far as oil and gas, but an extemely high potential for a scientist to go there to have access to study the area. For instance, on Shumagin Island, which is mostly covered by some—mostly granodiorite and some Cretaceous Shumagin formation is important for a geologist to go there to take samples and to understand that area, to project to the offshore areas on the Aleutian Shelf or the Saint George Basin in relation to the Pribilof Islands.

Mr. HARVEY. Any other comments?

Nonfuel Mineral Resources

Mr. Singer. Don Singer, USGS. The comments I'm going to make are from a report that we are going to submit to your files. The USGS has an open file 78–1E. My comments apply primarily to Umiak Island and the south—really the southern third of it or less than third of it that we have outlined or delineated as being favorable for high porphyry copper deposits. There are a large number of indications there of this type of deposit and this particular type of deposit has about the same grades and tonnages as the other porphyry copper deposits that were provided in the records yesterday, so I won't repeat that. An additional factor that is important about them is that this type of porphyry copper deposit tends to have gold values with it, which may be more economic. We have estimated that part of our area 13 is on the island and as far as our area 13, we have estimated that there is a 90-percent chance that there are at least 10 deposits. There is a 50-percent chance that there are at least 20 deposits and a 10-percent chance that there are 35 or more deposits. There is mineral potential on a few of the other islands, islands like Semidi have a possibility of containing the vein gold deposits which tend to be of small tonnage. Some of the other islands in the south of the peninsula also have this possibility. I think that will suffice for now.

Mr. Harvey. Thank you. Anyone else have any comments on the minerals area?

Mr. Hansen. Yes. Dave Hansen, Department of Natural Resources. I'd like to return to the energy related resources just for the record, to point out that in the island groups, there is 22,000 acres that have some coal potential, however, this is of a local consumption type of potential and from the Chignik Bay and lagoon area and the Herendeen Bay area, and just for the record, that apparently there is some local consumption going on of this coal. It is not of the type that would be of the commercial value.

Mr. Silver. Is that selected land, do you know?

Mr. Hansen. That is unselected Native withdrawal land.

Transportation and Access

Mr. Harvey. Does anyone have any comments on the transportation or access related issues that relate to the offshore islands situation? OK.

Mr. Wilson. I'm Maurice Wilson with the Department of Transportation, and we did put a map up on the wall yesterday, showing overlays of possible transportation corridors and that's about all we want to show today.

Mr. Harvey. OK. Good. Thank you. All right. Let's move on to the Togiak area. Yes.

Mr. Somerville. Mr. Chairman, Ron Somerville, Department of Fish and Game. I should point out something in transportation that came up in the prior committee hearings and that is the establishment of navigational aids in some of these islands, and it's just a question that came up that I just wanted to point out. What would they be allowed, you know, what would be the attitude of the refuge or whatever, or wilderness, however it's designated?

TOGIAK/CAPE NEWENHAM AREA

Scenic, Landscape, Historic, and Archaeological Values

Mr. HARVEY. All right. Let's move on to the Togiak, Cape Newenham area, as we defined it earlier this morning. Does someone want to kick off on the scenic, landscape values?

Mr. GORDON. Mr. Chairman, it seems that this time could be useful briefly to introduce a statewide map, since many of the regions of the State natural regions overlap along this part of southwestern Alaska, and I think this will save time as we go along in discussing the landscape or additional values, as many of them are fairly homogeneous throughout the given areas of the State. The base map is a map prepared by the Land Use Planning Commission, Major Ecosystems of Alaska. I think it will be helful to everyone in the room just to be able to see the vegetation types. I'll point each of them out and then they'll be visible from now on. They start out with yellow, which is alpine or dry tundra. Orange, which is moist tundra, and dark orange, which is wet tundra and coastal marsh. The brown, light brown here, is muskeg, low brush. The darker reddish brown here is high brush. The different colors of green here are the various aspects of boreal forest. The dark green here is the coastal forest, the so-called rain forest. Now, the black lines on the map are the major statewide landscape character divisions. They come from the landscape character study that I indicated, which was carried out yesterday for the Land Use Planning Commission. These are just the major subdivisions. They are based on three criterion, first, the physiographic divisions of the State; second, the major vegetation communities of the State, which are indicated on this map; and third, certain particularly visually obvious geological or land form characters, which differentiate regions. Any maps differentiating regions are bound to be compromises.

This one is oriented toward visual aspects. It probably most closely relates to the physiographic regions of Alaska, but I think in picturing what these areas look like throughout the State that these divisions will be helpful. I'll just point out the seven and then indicate the ones that relate to what we're talking about today. The northernmost region is the Arctic lowlands and foothills, the so-called North Slope. The region between these lines—Oh, the North Slope region is tundra. Between these two black lines is the Brooks Range. The dotted line indicates the crest of the Brooks Range. On the north side of the crest, the vegetation is tundra. On the south side, at lower elvations, it is boreal forest. Boreal forest meaning essentially the north woods, the cottonwoods, birch, white spruce forests. The interior region of Alaska, between the Brooks Range and the Coast Mountains and the coastal tundra, is entirely boreal forest. That is where the forest community grows.

This region over here, which includes the west coast, the Bering coast and part of the northern portion of the Alaska Peninsula, is what I call the western or Bering tundra region. It's entirely basically tundra. The southern portion of the upper Alaska Peninsula, the rest of the peninsula, the Aleutian Islands, and most of Kodiak Island, is in a region dominated primarily by volcanic deposits, high volcanoes, volcanic islands, with the exception of Kodiak. The dominant vegetation there is a combination of high brush, which—well, it's a transitional vegetation. Really down in the—most of the Alaska Peninsula, I don't think this map adequately indicates how much it dominates the peninsula. Your're talking about 10 to 20 foot high brush. The lower portions of the peninsula and the Aleutian Islands are dominated by what broadly could be called a tundra community, but actually in the more favorable sites it's a very tall grass plant, like the tall grass prairie and it visually is very, very different than the tundra in the other parts of the State. The community—the area in here obviously is the Pacific border ranges of mountains, the Alaska Range and the—most of the coast ranges. Vegetative areas within that range is boreal forest, just like the Interior, although there is some transition to the coastal forest. The coastal area here, which as you can see is almost entirely dark green, that is the gulf coast of the Alaska region, including the coastal slope of the mountains and it is dominated by the very dark, rather somber, austere looking coastal forests, Sitka spruce, western hemlock, yellow cedar.

OK, you'll note that a number of these regions, five of them to be exact, come together along the northern and eastern fringes of the area we're discussing today. That means that there is a great deal of visual diversity in that area, and as we go over each individual (d)(2) proposal, perhaps I could refer from the other side of the table here to the map. It will tell you an awful lot. I might point out that the key junction point in the Lake Iliamna area is an area of transition, and as we come to particular proposals in that area, I will cover it. When we get to the visual aspects of Togiak, this is the Togiak area in here, I'll include Hagemeister Island in Togiak, since it formerly was. I think now it's actually part of the coastal refuge, but it's of the Togiak landscape. There is a very striking series of spits, offshore spits or onshore spits, along Togiak Island and the adjacent mainland, one of which is probably the classic of its type in the State of Alaska. These consist or very narrow, very long spits that are a few feet to a few hundred years wide, sand or fine gravel, and they extend in some cases many miles out into the salt water. In the case of Hagemeister Island, one of them is particularly striking because of the rocks, the fine beach is quite colorful, some of the bedrock. The major landscape visual character of Togiak is of moderately high to medum mountains, widely separated on a gently rolling plain. It's probably the classic example of that type of that of landscape in Alaska, extensive rolling upland plains with mountains of moderate height over of the area. Toward the eastern edge of the area, the mountains are—though no higher in elevation, have been more gracefully sculpted and there are certain—these oblongs, these squaretop tentacles I was talking about, rather dramatic scenic value. There are a number of rivers that flow through or from this area. We referred to the Kisaralik yesterday. Mr. Hession will talk about the recreational character, but I might point that these rivers are avery important aspect of the visual character of the land.

I call it cottonwood country. It has a visual appearance of light green. It's mostly a mixture of tundra brush, with a lot of patches of cottonwood. There's no spruce forest in the area and this cottonwood is particularly characteristic, perhaps more than other parts of the State. The most dramatic single visual feature over here, which encompasses the area I'm now circling with this pointer, is a series of fairly large mountain lakes, which is not duplicated elsewhere in Alaska to this extent. There's an entire chain probably of several hundred of them. They vary from 2 to, oh, about 10 to 12 miles long. Most of them moraine-dammed lakes that are set at the heads of valleys entering in the mountains. Some of them such as over here, are actually rock basin lakes or they're set in deep canyons. Collectively, the visual importance of these lakes are—well, not excelled in the State of Alaska. Now, the most dramatically or the most heavily glaciated portion on the eastern edge of the Ahklun Mountain region, this is the Ahklun Mountains, they are State selected land. The Wood-tikchik Lakes area, however, the same types of visual character, although to a slightly less dramatic degree and lakes tend to be more scattered and smaller, throughout the—a good portion of the Togiak area, the portion I'm circling, and I would say visually that is the outstanding resource of the area, which is not equalled elsewhere in the State. Thank you.

Mr. HARVEY. Dick, you wanted to say something?

Mr. STENMARK. Yes. I don't have any particular comments on the descriptions that Mr. Gordon has given here regarding this, but I would like to make a couple of comments on the landscape study that has been referred to here the last couple of days. This is a study that was being done by Rich Gordon here and Ben Shane, as temporary employees of the Land Use Planning Commission and they have fairly well completed this work now, but it has not been fully reviewed by the Commission staff yet, nor does it have the Commission's sanction, so I just want to put it in that perspetive. I have reviewed it and I think a lot of the elements that have gone into it are very satisfactory. Thank you.

Mr. HARVEY. Thank you. Jack.

Mr. HESSION. Jack Hession, Alaska Coalition. It's the high alpine lake country that Mr. Gordon was referring to, in combination with the numerous rivers of the Ahklun/Kilbuck Mountains, which I think gives the area its distinctive recreational importance. The lakes, of course, provide easy access via floatplane and once there, you have the usual recreational activities associated with high alpine lakes, fishing, camping, wildlife observation and superior alpine tundra hiking possibilities. Then you have the opportunity to descend to either the coast and estuarine situations or to the Kuskokwim drainage and the wetlands type of landscape that we discussed yesterday, via at least seven routes of major field terrain. These have several characteristics in common. There are lake stream systems, which means you have the access plus you generally have clear water, which gives it an aesthetic importance. Most of them are excellent sport fisheries and include major commercial fish runs. As I mentioned before, many of them end at estuaries and thereby the wildlife observation opportunities are enhanced. Several or perhaps all of them, I'm not sure, end at villages or you can go down to Bethel and thereby either at the villages or at Bethel, take advantage of schedule airline services, and that means, of course, that the cost of the recreational opportunity is roughly half. Thank you.

Mr. HARVEY. Does anyone else want to comment on the scenic values? Go ahead.

Mr. CURTIS. Bob Curtis, Alaska Professional Hunters. I'd like—so people will know what—that I do know that area over there, I've lived there 7 months out of the year for 12 years, and I've been associated over there with sport fishing and hunting for longer than that, about 16 to 17 years. The area in the Togiak, as Mr. Gordon was pointing out, there are some beautiful lakes there, however, I would argue that the more beautiful lakes are the Wood River, Tikchik Lake areas. Absolutely fantastic, there's no place in the world that they are prettier. However, I feel that you're going to have to go very careful on access. If you don't have something in there for access, no matter whose bill you wind up with, the only thing you're going to lock at is a bunch of squirrels and a few eagles and ducks and fish, if they can see very far out of the water, and it would be a sin to lock that up to that deal. I might further say that if you're going to restrict vehicles that have been in there since year one——

Mr. HARVEY. Excuse me a second. You're dealing with a subject that I think we're going to take up later on on the transportation access subject. We're trying to get comments here on the values that you started out talking about.

Mr. CURTIS. Well, that's what I'm trying to bring out, the values.

Mr. HARVEY. Well, I undertstand, but——

Mr. CURTIS. In relation to access, you don't want to hear that?

Mr. HARVEY. No. We——

Mr. CURTIS. OK.

Mr. HARVEY. As I indicated, we do want to hear it, but we're attempting to get all the access comments at one place.

Mr. CURTIS. All right.

Mr. HARVEY. You know, just as we have all the mineral comments in one place.

Mr. CURTIS. OK.

Mr. HARVEY. Does anyone else want to talk about the scenic landscape values?

Mr. DAPKUS. Dave Dapkus, Heritage Conservation and Recreation Service. We propose one river within the Togiak area and that is the Kanektok. It has really three main values. First and most importantly is its fisheries, which some of the other gentlemen will talk about later. it does have all five species of salmon. The most important one, as we understand it, is pink. It also has rainrow trout, char, grayling, and lake trout. It supports a commercial fishery and a subsistence fishery. This is one of its big values, as far as a wild river goes. It also is a waterfowl area and the third value is its recreation, as Jack Hession said. It is a good river to float, for the intermediate canceist, and it has good access in a lake and it also flows out to Quinhagak Village that you can fish commercial or service out of. It's a good hunting and fishing area and also taking the upper area, it's a great hiking area, so it does have great recreation potential. Thank you.

Mr. HARVEY. Thank you. Any other comments on that aspect? All right. Let's go on to the wildlife values, in terms of habitat and use patterns. We've got subsistence, sport hunting, commercial hunting.

Wildlife and Fish Resources and Uses

Mr. HANSEN. Dave Hansen, Department of Natural Resources. On a statewide scale, the area which is about 4.5 million acres has a rating of in the top 60 percent of the State's wildlife habitat or about one-third of that acreage or 1.5 million acres. Three million acres is rated in the 7th 10 percentile or lower, so you have more of a moderate overall wildlife habitat in this area, as compared to some of the other areas.

Mr. HARVEY. Any other comments? Yes, sir?

Mr. CURTIS. Bob Curtis. The Togiak area, if you were to consider all the Bristol Bay area, down the peninsula and what not, it would be very hard to lump them all into one category. The Togiak area, over to and including Dillingham and even further east until you get way back up there, has very little game at all, very, very little. In relation to the whole State of Alaska, very frankly, except for brown bear, which, beieve me, it isn't very good for that, doesn't really have any valued big game. It does have a terrific value with sports fish and, of course, everybody knows, commercial fish. Its biggest value by far would be— resourcewise or recreational, would be sport fishing, observing what game you might see, but there's very little game. Even moose, there's very few moose in that particular area. Very few caribou also, until you start getting way north.

Mr. HARVEY. Any other comments?

Mr. SCHMIDT. Yes. Ted Schmidt, U.S. Fish and Wildlife Service. Well, the fishery aspect has been pretty well covered. I'll pick up on the birds and some on the mammals, and I' like to go back to the cultural aspects, too. Togiak has national and international significance for migratory birds as a stopover area for birds from Asia, New Zealand, South America, and North America as they go to and from their wintering grounds. There's large saltwater lagoons with associated eelgrass beds in the inland lakes and ponds, which probably consitute the area's most important waterfowl habitat. Common nesting species include oldsquaw, common scoter, greater scaup, and the pintail. Common migrants also include black brant, Canada geese, and emperor geese. Doctor Bartonek commented on the sea birds, but I'll mention the sea bird colonies in the vicinity of Cape Pierce and Cape Newenham, which probably constitute one of the area's outstanding wildlife features and more than a million sea birds frequent the offshore waters during the summer months. Murres and kittiwakes are probably the most abundant of the cliff nesting species, but other common sea birds include horned and tufted puffins, parakeet auklets, double-crested, pelagic, and red-faced cormorants, marbled murrelets, and pigeon guillemots.

Eight species of raptors occur in the area, including goshawks, rough-legged hawks, gold and bald eagles, osprey, and gyrfalcons.

Bald eagles are probably the most numerous of the raptors along the coast.

The refuge does have a diverse mammalian fauna and it has 32 species of land mammals, ranging from the shrew to the brown bear, in addition, seal, sea lions, and walrus occasionally haul out on the shore. Local Eskimos still rely on these marine mammals.

Mr. SOMERVILLE. When you're referring to the refuge, do you mean the existing Cape Newenham Refuge?

Mr. SCHMIDT. Yes. Local Eskimos still rely quite heavily on marine mammals from the area. Historically, when Caucasians first visted the area in the 1800's they were impressed by the large numbers of brown bear and there were fair populations of caribou and moose. Probably with the introduction of modern firearms and improved mechanized access, there's been a substantial decline in brown bears and we estimate from the Fish and Game and Fish and Wildlife Service bear surveys that have been done there, there's probably less than a hundred brown bears in the area now. But it has the potential for a larger brown bear population and it also has a potential for a caribou population. Furbearers are, historically, very important in the area and probably to some extent were extricated when the fur traders arrived in the area, but still it has red and Arctic foxes, gray wolves, wolverines, mink, weasles, otters, lynx, beaver, muskrat, snowshoe and tundra hares, marmots and ground squirrels.

To pick up on the fishery a little more, Togiak's river systems contribute approximately 1.7 million salmon to the Bristol Bay fishery and you have all five species represented, sockeye, coho, king, pink, and chum salmon, and these resources are important to the commercial and subsistence fishery in the area. The Kanektok River has the northermost spawning run of steelhead trout in North America. The resident species include rainbow, dolly varden, lake trout, Arctic grayling, Arctic char, northern pike, and whitefish. I'll maybe go back to the cultural thing a bit. The earliest known site in the Togiak area from an archeological standpoint is the Norton Period, dated 500 B.C. and there are many known archeological sites on the Togiak River and it is regarded as potentially a fairly rich area for prospective cultural values. The Fish and Wildlife Service does plan to do some reconnaissance work dealing with archeology in the area and to try to get a better handle on bear populations in the area. That's all I have on Togiak.

Mr. HARVEY. Thank you very much. Yes?

Mr. SOMERVILLE. Ron Somerville, Alaska Department of Fish and Game. With the sport fish and game and commercial fish divisions, we'd like to add a few more points to Mr. Schmidt's testimony here. Also, I think at this point it's—in response to Mr. Quarles' and Harvey's comments or questions about the statewide survey, I think it's important here, the reference by Mr. Hansen, to point out a couple of key things. And one, the Alaska Department of Fish and Game did the statewide rating and it was done almost exclusively for the purpose of State selection and classification, and you have to keep that in mind and I think it's very important. Now, you can compare areas. We separated fisheries and wildlife. You can compare areas in the lowlands and probably use the system fairly effectively, and let me give you the reasons why it starts to break down, however, when you consider other things. We do not think that it has very much value in uplands (d)(2) comparisons, for the following reasons. One, we did not consider things such as wilderness species, unique species, critical habitat. For instance, like the Wrangell Mountains, places like this, are the highest producers of Dall sheep in the State. Their diversity in productivity is relatively low per acre, though, and the main emphasis of the statewide rating system was on critical habitat, diverse in productivity. Thus if you look on a statewide basis, 10 percent, top 10 percentile, 26 million acres, you'll see that most of this is key waterfowl areas, furbearers, lowland big game species.

Mr. HARVEY. Ron, maybe I could interrupt you and clarify something here, because I think you might be riding a straw horse.

Mr. SOMERVILLE. Well, I think it's important——

Mr. HARVEY. OK. Finish, go ahead.

Mr. SOMERVILLE. Pardon? When you start to compare these, like, for instance, McNeil River is one of the best brown bear viewing areas in the State. There's no way, because of low productivity and diversity, you could pull that up in a rating and ranking system to make it compete on a statewide basis. Similarly, some of the main areas that are considered in national interest for wilderness species or unique species will never rank high enough to be on a comparison basis. That's——

Mr. HARVEY. Could you explain something? What is a wilderness species?

Mr. SOMERVILLE. Well, referencing those species which—like wolverine, brown bear, wolves, some of these species which require very large areas to—for their existence, to maintain them, and——

Mr. HARVEY. (Indecipherable due to simultaneous conversation.)

Mr. SOMERVILLE. Traditionally called wilderness—yes.

Mr. HARVEY. Yes. OK. I understand.

Mr. SOMERVILLE. And on the national interest, these come into more of a spotlight and are probably more concerned than some of the other species. I'm just saying, we emphasize the productivity, the diversity, and the critical habitat on a statewide basis, thus ranking the lowland areas, class two soils, ranking highest on a statewide basis and that's what you stared to see yesterday. When you look at the Yukon Delta, you'll look at the flats, some of these areas that are ranked very high because of that productivity.

Mr. HARVEY. Yes. Dave?

Mr. HANSEN. Dave Hansen, Department of Natural Resources. Just a comment on that is that, yes, this is a general rating system emphasizing habitat and as he mentioned, productivity and your overall area development. It needs to be complemented with, in particular, information about rare species or endangered species, which nobody has ever debated or denied. What you're getting is an overall wildlife habitat evaluation and obviously, the peregrine falcon are the most important thing in the Nation if they're the only thing in an area on this rating system, it's not going to come up that high. So this is a complement. Likewise, in the area, take minerals. Obviously, this rating system, since it is to a township level, doesn't give you exact locations of certain placer deposits and so forth, but the system is complemented with the detail data of particular finds or mines and the same way in the wildlife area. And I think it's a good clarification to make.

Mr. HARVEY. Yes, and again, obviously, it's all ranking only within the State.

Mr. HANSEN. That's right.

Mr. HARVEY. It's not ranking Alaska copper against Arizona copper.

Mr. HANSEN. No. No. It's just against the State's own; yes.

Mr. SOMERVILLE. Mr. Chairman, I still would emphasize, I'm not just talking rare and endangered species. We're talking about species which are high in national interest for a variety of other reasons, you know. Obviously, brown bear is not an endangered species, nor are wolves, nor are wolverines, nor are many other species, which may be of national interest, but would not rank high enough under a critical habitat evaluation on a statewide basis. As far as the (d)(2) areas, the upland (d)(2) areas are concerned, we consider this very, very low quality evaluation for what you're considering here and we would emphasize, it shouldn't be used on the high land areas that much.

Mr. HARVEY. So what you're saying is that if the State says it's in the ninth 10 percentile, that it still might have value——

Mr. SOMERVILLE. That's right.

Mr. HARVEY [continuing]. National value?

Mr. SOMERVILLE. Yes.

Mr. HANSEN. They may have the best peregrine falcon nesting ground or the best sheep habitat in the State.

Mr. HARVEY. I think that we understand that. I don't think we're being exploited by the numbers. I don't trust computers anyway.

Mr. SOMERVILLE. I'd like to call on just the three divisions quickly to emphasize some extra points.

Mr. HECKERT. I'm Larry Heckert with the Department of Fish and Game, and I'm with the recreational side of this. Just one thing, there's very little I can say that hasn't been said. I, essentially, agree with the gentlemen on my left and my right. They very well may know some of the areas greater than we do or better than we do, but as a department, we do view this Togiak area and some of the surrounding area as real quality fishing area. It's high on the study because there's a wide diversity of species and I think most of these have already been pointed out. In general, the stocks are in good shape. It is a quality fishery. The use, frankly, we have a difficult time qualifying it, but we feel like it is probably light to moderate and then probably higher, depending on seasonal availability of certain species. There's a number of lodges within the Nushagak/Iliamna country that utilize this area a lot and to some extent, depend upon it. Of course, there's been a traditional subsistence use of these species over the years. There's a feature of the Togiak system that is similar to others, Kanektok and Goodnews. Someone will talk to you later on the Iliamna area and that's their suitability for floating. It's a very popular method for recreational fishermen and it is one that we encourage, because it tends to distribute the recreational use over a greater area.

You don't want to speak at all to access, but a few words that are probably important——

Mr. HARVEY. We'll pick that up at the end. I think we can get into that whole area then.

Mr. HECKERT. I have nothing further then. But this is a quality fishing area and one the Department recognizes as such.

Mr. HARVEY. Any other comments? Any comments on subsistence uses as well as sport fishing?

Mr. CLINE. Mr. Chairman?

Mr. HARVEY. Yes, go ahead.

Mr. CLINE. Dave Cline, with the Alaska Coalition. I'd just like to emphasize the high national/international value of wildlife habitats, particularly the coastal and inshore habitats for migratory waterfowl, shore birds and marine birds. Also the variety of marine mammals that inhabit these inshore waters. I feel that this is where we're going to have to have close cooperation between the managing—Federal managing agency and the State of Alaska to provide all the necessary protection to these coastal habitat and resource values, particularly eelgrass beds adjacent to Hagemeister Island and the variety of lagoons, estuaries, ponds, lakes and marshes along the coastline of this proposal area, not to overlook the sea bird cliffs, which have been mentioned previously, so I think it's an area that deserves close attention by both State and Federal managing agencies and that we can maybe work out cooperative managing agreements. I do feel that some sort of protection should be provided, be it an offshore refuge proclamation boundary or whatever, out to about 6 miles, to give the managing agencies added cause in protecting these very important inshore habitats from long-range adverse impact, particularly from any tanker traffic that could occur in the future, or any offshore oil and gas development. These would be the major threats to these near shore habitats.

UNIDENTIFIED VOICE. How would the 6-mile designation do that?

Mr. CLINE. I think an offshore boundary would be somewhat of a deterrent, first of all, to undesirable ship or boat traffic. It would not interfere, of course, with commercial fishing activities or subsistence use of inshore, but I think it would help in routing tankers, for example, and that it could give the State and the Federal Government a little bit extra cause in properly managing oil and gas activities that we could see there in the future, be they actual drilling activities or—I don't know what the industry's plans might be in terms of inshore facilities, but energy siting facilities could become very important in this region in the future.

Mr. FISHER. Joe Fisher, Alaska Miner's Association. Are they talking particularly of the Togiak Wildlife Refuge or are they considering the Cape Newenham Wildlife Refuse and the adjacent coastlines?

Mr. HARVEY. They're talking about the entire area, both.

Mr. CLINE. Well, there's one or two different things, I think. Two different—the shoreline is one type of habitat and the inland is a different type and I think you've got two different things here.

Mr. HARVEY. Any other comments? Yes?

Mr. FERRILL. Jim Ferrill, Alaska Department of Fish and Game. I would like to comment on the—both subsistence and recreational uses of game species within the area. Basically, there are—as has been mentioned, the area is hungry country. Moose are present primarily in the Wood-tikchik area and what-have-you, and as you head to the west, they virtually drop out. Brown bear, as mentioned, is the most abundant of the big game species. Black bear are also present in small numbers. Small game, ptarmigan, and marine mammals are among the most important of the subsistence species utilized within the area. Waterfowl densities are not particularly great in the area, except in the fall and the spring migrations and even there, then for the most part, they don't compete with the concentrations that you see in other areas of the Alaska Peninsula and on further down. The primary use of game species within that area is subsistence. It is primarily by local residents of the Villages of Goodnews, Togiak, Twin Hills, Manokotak, Aleknagik and other such places. The recreational hunting is almost limited entirely to brown bear and they're along the coastal zone. A little bit of recreational brown bear hunting also occurs in the Wood-tikchik system; moose hunting, recreational, occurs within the Wood-tikchik system.

Transportation is probably the most important single factor in determining what is used and by who. The recreational hunters who go in for brown bear and moose utilize primarily aircraft, either wheel or float equipment, and also utilize boats throughout the lake system itself. The subsistence hunter, the village hunter, utilizes boats very heavily, particularly in the spring for marine mammals and waterfowl hunting, but also they utilize the snowmachine. The snowmachine is utilized for trapping and hunting. Conditions are such that there are, in most winters, there is virtually no place within that area, unless it's straight up and down, that a snowmachine can't get to. Flying over the area in the winter indicates a constant crisscross of trails. The advent of the snowmachine and the modern firearms and harvesting techniques have had an impact on the game population in that area. Moose move into the area primarily from the Wood-tikchik system and once snow is on the ground and they can travel, are taken just about as rapidly as the hunters can find them. This hunting does not occur in accordance with the State's regulations. It does occur in accordance with, you might say, traditional uses for the people there. They take a game animal to eat whenever they can take it. Brown bears are taken by local residents as a meat animal. The beaver resource in the area, we have had a closed trapping season on beaver in there for many years and we are only now considering opening it again. This has been because the local use has overexploited that resource and it has been necessary to protect it by drawing back. I have a couple of comments, if I could, further on access or I could hold those 'til later.

Mr. HARVEY. Why don't you just hold those 'til later? Any other comments on the wildlife. Yes, sir?

Mr. CURTIS. Yes; I'd like to—Bob Curtis. I'd like to point out, a lot of this testimony that has been going on is jumping back and forth across the backbone called the range of mountains right along the Wood-tikchik area, the western end of those lakes, and to the west, like I think it was Mr. Ferrill said, it's really hungry country. To the east, it's much better and you've got totally two different sets of figures whenever you're talking about west of the—that range or in the Togiak Drainage really, Togiak, Goodnews or in the Wood River, Nushagak Range. That's two entirely different—like day and night.

Mr. HARVEY. Thank you. Yes?

Mr. CLINE. Mr. Chairman, Dave Cline, Alaska Coalition. We've heard a lot about—in fact, the historical records show that here were possibly much higher big game populations in the Togiak area in the past, particularly caribou, moose, and grizzly bear. We've also heard that possibly there's been overutilization. I'd like to ask the Department of Fish and Game if, with the proper research and management on many of these lands, whether or not we could bring back these big game populations to much higher levels than they are now, for their various values to people?

Mr. FERRILL. Jim Ferrill, Alaska Department of Fish and Game. Yes, it appears that with the cooperation of the local residents there and what-have-you, that higher densities of game animals could exist and we have been working closely with the villages out there as much as we could in order to insure this cooperation. But the primary factors right now in the lower densities of game in that area do appear to be overutilization.

Mr. HARVEY. Thank you.

Mr. RANDALL. Richard Randall, Commercial Fisheries Division of the Alaska Department of Fish and Game. I'd like to make a few comments on the commercial exploitations of wildlife species in the area. I think the overall documentation of the commercial fishery on salmon is fairly well documented in the Togiak/Kanektok/Goodnews area, however, I'd like to point out that the specific comments on the Kanektok River, the statements have been documented on all five species, in the average neighborhood of 6,000 kings, 100,000 sockeye, a million chums, pinks and cohos combined for the Kanektok River, and average commercial fish potential in recent years has been 300,000 combined catch for all five species, and subsistence catches have been between 5,000 and 10,000 and the Togiak District, we have four commercial sections along the coastline, dividing the Togiak proposal and average commercial harvest in this district includes upwards of 200,000 sockeye salmon, about 35,000 kings, and 100,000 chums, pinks, and cohos. And there hasn't been a connection up to now; we have a developing herring fishery also developing in the Togiak District, which hasn't been mentioned so far.

A lot of this has been a result of the extension, 200-mile extension of domestic fishery rights to offshore waters. We've been monitoring the herring fisheries since the late sixties and until 1977, the fishery remained relatively small and it mushroomed into a 3,000-ton sackerel harvest in 1977, and had a guideline harvest level for 1978 of 6,000 metric tons. And all of this fishery takes place within the immediate shoreline areas of the Togiak, Cape Newenham area and involves anywhere for 80 to 150 commercial fishermen. The salmon fishery includes about 85 commercial fishermen, and I wanted to point this out, that access by the commercial operators is mandatory because of poor access and protection along the coastal areas, that they rely on considerable protection along these coastal areas to conduct their operations.

Mr. HARVEY. Could you explain that? I'm not following. You say poor access and protection. I don't understand.

Mr. RANDALL. Well, most of the coastal areas there, because of the physiography, which has been well described up to now, is rocky and——

Mr. HARVEY. Oh, so you're talking in physical terms?

Mr. RANDALL. Right. Right.

Mr. HARVEY. OK.

Mr. RANDALL. Well, I did want to mention specifically this herring fishery that is developing now. We don't know how the fishery is going to develop, so it's still unknown to us also. I wanted to include that, in addition to the documentation that's very well available on the salmon commercial fishery in the area. I just wanted to mention that both herring and even capelan which is a smelt, the commercial exploitation of these species is on the increase also and the future direction of the fishery isn't really well defined yet.

Mr. HARVEY. Thank you. Are there any other comments on wildlife use, subsistence use? Yes, go ahead.

Mr. SOMERVILLE. I think one of the points that's been brought out here and should be emphasized again, we feel we're creating a mass of legal jurisdiction problems here when the North Pacific Fisheries Council establishes with, you know, the Secretary of State, Secretary of Commerce and the State on the inland—one—on within 3 miles, the regulations. And we are considering further jurisdictional extensions by the Secretary of the Interior and I just wanted to point out that, depending on the definitions of subsistence and the boundaries of these particular areas, we're going to have a tremendous overlap in jurisdiction and it's something that should be addressed at some point.

Mr. HARVEY. It will be. Any other comments on wildlife or subsistence?

Mr. CURTIS. Is there any place in this discussion for the numbers of people that are actually in this area and also the number of outsiders that come in to use the area?

Mr. HARVEY. Well, Mr. Stenmark gave us some population figures at the beginning.

Mr. CURTIS. Well, I'd like to contribute some additional figures.

Mr. HARVEY. Go ahead.

Mr. CURTIS. And that would be the sports fishermen from outside, that live outside of this area. This would be probably classed as a commercial sport fishery, however, it's recreational, but people are making money doing it. In the Dillingham area, which would include Togiak, you're talking at least 4,900 man-days. That's last year.

Mr. HARVEY. You're including the Wood River, Tikchik Lakes there, too, I assume?

Mr. CURTIS. That's the Togiak—fishing the Togiak system, the Quinhagak and the Wood River, Tikchik system, and they use—they get there by using aircraft.

Mr. Harvey. Is that generally spread around or would more of that be in the Wood River, Tikchik area?

Mr. Curtis. Right. That's pretty well spread around. Then there are these that we know of. Then there's additional commercial sport users from Iliamna coming over there, that would contribute, very conservatively, 300 man-days a year. That would probably be very conservative. Then there's our Anchorage people that come down on their own, commercial airlines or fly their own aircraft. That would be easily a thousand more man-days. Now, in living over there as long as I have, I've seen that the Native people that are living there do use the entire area for one thing or another, just about constantly all year round, and their population, excluding King Salmon, but the villages on the Nushagak, the Togiak, the Quinhagak—not the Quinhagak, the Goodnews, you'd be talking 3,400 people.

Mr. Ferrill. Jim Ferrill, Department of Fish and Game. I'd like to make one statement, which I didn't emphasize heavy enough. In the trapping in the Togiak area and what-have-you, it is primarily by local residents and should be considered commercial trapping, in that the major reasons for being out there is the cash return that they get from the furbearers and I think that should be emphasized as the major use of the furbearers in that area.

Renewable Resources

Mr. Harvey. We're turning now to the renewable resources area, timber, agriculture, grazing. Does anyone have any comments? Yes, go ahead.

Mr. Hansen. In the area of agriculture overall, there are about 20,000 acres of the 4½ million acres that have been identified as having agricultural potential and they fall within the fourth 10 percentile, so they are in the top half of the agricultural potential of the State. This——

Mr. Silver. In what area, Dave?

Mr. Hansen. Near the Nushagak Peninsula.

Mr. Harvey. Jim, do you have a comment?

Mr. Hansen. This is a map of the Togiak area. Do you want to point to it again, Jim, to be sure? It's just to the north, and the area of forestry——

Mr. Harvey. A fair amount of that has been selected by the Natives, hasn't it?

Mr. Hansen. Yes, it has. In fact, well, it would be nearly 95 percent that's been selected by the Natives.

Mr. Harvey. Anyone else? Yes, go ahead.

Mr. Epps. Alan Epps, from the Cooperative Extension Service. The other part of the agricultural picture that isn't shown in the State's analysis does relate to reindeer grazing for this area. Historically, there were several herds in the area. At the present time, however, there are no major herds, except for the one that Dick Stenmark mentioned earlier.

State and Native Land Selections

Mr. Harvey. Anybody else? All right. Let's go on to the non-Federal Lands area, with the State Native selections. Dave, do you want to tell us about that?

Mr. HANSEN. Well, the State currently owns about 51,000 acres of this 4½-million-acre area. We have an interest in 674,000 acres. 674,000 acres are located primarily along the western border of the Wood-Tikchik Lake area, the southwestern border. This takes in the western side of the Wood-Tikchik drainage, which we feel would be a good addition to the Wood-Tikchik Park area. Also lands surrounding Bethel, I'm not sure where Bethel is on that map exactly.

UNIDENTIFIED VOICE. [Inaudible.]

Mr. HANSEN. It's outside the area, OK, so all the lands for this one, then, are just around your Wood-Tikchik area, along that border, that are outlined in orange.

Mr. SILVER. Dave, how much of that is (d)(2) land and how much is (d)(1) land?

Mr. HANSEN. Oh, I would have to check that. I believe—

Mr. SILVER. Ball park.

Mr. HANSEN. I believe it's—yes, some (d)(1) lands, but I believe the majority is probably (d)(2). Is that right, Jim? The majority is (d)(2) classified.

Mr. TILESTON. Or 22-E replacement lands. There's substantial 22-E in there.

Mr. HANSEN. On the Native selections, the Natives have selected 1.1 million acres of this 4.5 and it's expected that they will probably keep at least a half million acres of their selections there.

Are there any other comments on Native selections? Go ahead.

Mr. HESSION. Thank you. Jack Hession, Alaska Coalition. Two questions for Mr. Hansen. One, I'd like to know how long the Wood River/Tikchik Lakes have been in State ownership and for how long they've been proposed for State park status? What is the status of that park proposal now? And second, in terms of the Bierne initiative on November's ballot, is that land vacant, unappropriated, unreserved State land?

Mr. HARVEY. Go ahead, anyone who wants to answer it.

Mr. HANSEN. OK. The first point is, I will ask for confirmation of this, but I believe that land has been——

UNIDENTIFIED VOICE. It was withdrawn in 1962.

Mr. HARVEY. 1962 was when it was filed on.

Mr. HANSEN. That early? OK. I knew it was before 1969.

Mr. HARVEY. I would confirm this gentleman's 1962.

Mr. HANSEN. And the status of the legislation is, the State has introduced legislation to make this entire area into a park. It did not pass last session, however, this session, it is—it has—it is still in the legislative mill. It is my understanding that some of the problems in the area where the Native corporations have been worked out and there is a much better chance of passage this session than there was last session.

Mr. HARVEY. OK. And there was a third question, about——

Mr. WALDROP. The second part of the question.

Mr. HARVEY. The Bierne issue.

Mr. WALDROP. The second part of the question refers to that and it's my understanding that the land is so classified not to be available for selection under the Bierne initiative or the Bierne bill.

Mr. **Harvey**. Thank you. Could you—could the State submit a brief summary for the record of what we're talking about when we talk about the Bierne initiative or the Bierne bill?

Energy Resources

Mr. **Waldrop**. Sure, yes; easily.

Mr. **Harvey**. OK. Fine. There seems to be a lot of information on that. Any other comments with respect to the Native selections or State selections? All right. Let's turn over now to the energy values in this area. Any comments? Go ahead.

Mr. **Sisson**. I'm referring to the Togiak National Wildlife Refuge and the Goodnews Bay quadrangle. This is the area north and east of Platinum, in the upper mountains. This area is on the surface and the outcrops, it is mostly sedimentary rock ranging in age from probable Cambrian to late Paleozoic rock and consists of clastic rock, chert and clastic volcanic rocks. It is very complex in quality and quantity and much of the rock has been semi to hardly metamorphosed. The rocks are of interest as for as the petroleum geologist is concerned. These rocks are particularly important, although we feel that the—we do not know very much about the potential of the oil and gas possibilities in this area. They are particularly important as far as to study this area to understand or have a better understanding of the Bristol Bay basin to the south and the offshore areas. The thickness of these sediments that I'm referring to is over 13,000 feet and a field geologist would want to get in there to study these rocks to project his interests out to the offshore areas. Over to the east in the Nushagak area, Nushagak Peninsula, which is within the Bristol Bay basin, this area also is very little known as far as the oil and gas potential, although it does have oil and gas potential and it's part of the Bristol Bay complex and the Bristol Bay sedimentary basin. There again, an exploration team would like to get in there to do subsurface work, either by core drilling and so forth, in order to project their scientific reasoning and interpretations to the offshore areas of Bristol Bay.

Mr. **Harvey**. Do you mean to imply here that you have not—that none of this has been done at all so far?

Mr. **Sisson**. Some has been done.

Mr. **Harvey**. Some has been done, OK.

Mr. **Sisson**. But in the field of geology, it is somewhat of an inexact science, we would say. You'll go back and do an interpretation and then another person or another group would do the same interpretation and get another sort of an idea and that's the way all of it is done. It is a never-ending processs. It is not just going in and getting the rocks and looking at them and getting finite answers.

Mr. **Harvey**. Any other comments on the energy issue?

Mr. **Bishop**. Yes; my name is W. C. Bishop. I'm manager of subsurface resources for the Bristol Bay Native Corporation and I would endorse what Mr. Sission said and also I would like to point out the Nushagak Peninsula. We have done some seismic work there. Apparently no one knows much about it, but we have some information. Then after this is the area that is potential area for uranium as well, and I think that should be—that would be primarily the green part on the map behind you there. Extending on up into the Native selections on that peninsula. I think that's quite important, not only for the onshore oil potential, but for offshore oil potential as well.

Mr. HARVEY. All right. Yes, Dave?

Mr. HANSEN. On a statewide basis, there are about 200 and—excuse me, 410,000 acres identified as having oil and gas potential in the proposal area. Of that, 247,000 are located in this fourth 10 percentile of the State's oil and gas potential and the remainder, 163,000 is in the fifth 10 percentile for oil and gas potential. The highest potential is in the Nushagak Peninsula, by our assessment and that would be about two-thirds of your oil and gas potential in the general area. In the area of uranium, again, it's somewhat the same area geographically, but there are 1.4 million acres identified for having some uranium potential, but that 1.4 million acres falls in the fifth category or lowest category of five for rating uranium potential on a statewide basis. Thank you.

Mr. HARVEY. Any other comments? Yes?

Mr. FISHER. Joe Fisher, Alaska Miner's Association. This is also with nonrenewable resources, but in the northwestern corner of this area, there is a belt of pre-Cambrian metamorphics that are a possible source of uranium.

Mr. HARVEY. Any others on the minerals? We can get energy and nonenergy both.

Mr. CURTIS. Energy.

Mr. HARVEY. Go ahead.

Mr. CURTIS. OK. What about the hydro? There are some hydro sites that have been identified a long time ago. What would be the situation with those?

Mr. HARVEY. We need to know about that.

Mr. CURTIS. They still are—would they be identified in these claims as hydro sites?

Mr. HARVEY. Not necessarily, no.

Mr. CURTIS. Oh, OK. Well, there are—Alva Lake, Lake Alva, just north of Dillingham, probably about 35 miles. Then there's the Grant's River Falls, another about a 90 degree—or a 90-foot vertical drop, and that would be about 50 miles north, northwest of Dillingham. There are three or four others that I'm really not too familiar, I couldn't tell you, but I do know that they're there and they have been—whether it was the State or the Federal, they were identified as hydropower sites.

Mr. HARVEY. Potential sites, yes. Dave, do you want to comment?

Mr. HANSEN. Yes; I'd like to comment on that. We will have for you this afternoon a submission to the record and for your use, a map of the entire State, identifying all the hydropower sites and geothermal sites and general, I guess, highest potential energy sites, which should help us as far as facilitating this, because your geothermal and hydropower cover a good part of the State. I think there are more than 75 just in one category, sites that have potential.

Nonfuel Mineral Resources

Mr. HARVEY. Any other comments on energy, minerals?

Mr. LAMBETH. Bob Lambeth, U.S. Bureau of Mines. We do have some comments to make on the mineralization in the area. Basically, there are three geologic terrains, a pre-Cambrian gneissic schist belt, in the northwestern part of the area, has potential for both uranium and placer gold. There are gold placers in the area. The source of the gold may be the gneissic schist. You could also infer from the size that it extends farther to the northeast. Southeast of the pre-Cambrian schist is a wide belt of tertiary and cretaceous interbedded siltstones, sandstones and marine volcanic rocks. In these you would expect to find volcanogenic massive sulfides similar to those being mined in the northwestern Yukon territories and in the Appalachians. There is one known occurrence which may indicate volcanogenic potential. We really don't know. We haven't studied it in sufficient detail. Also running through this area are numerous small tertiary intrusives. These are probably the source of the mercury, and molybdenum that has been reported in the area.

Mr. HARVEY. Any other comments?

Mr. MENZIE. Dave Menzie, USGS. In our level II study for 78–1D, there are four areas which would fall within this area. Also, I should point out at this time that there was some level III work which is currently underway in the Goodnews Bay Quad. Area One in our study has historic placer activity and for both platinum and gold. The platimum activity was at Goodnews Bay, where 20,000 kilograms of platinum were produced and drilling apparently demonstrates that the pay streaks continue to the south along the Salmon River Valley as far as Happy Creek, but not as far as Chagvan Bay. There is also some possibility of placer platinum offshore, when the sea level is at lower stance. There is not sufficient information to evaluate this. The drilling that has gone on in Goodnews Bay and offshore has been incomplete. Areas two and three in our study have been historic placer gold producing areas. They've produced less than 3,100 kilograms of gold in each case. Area four is part of the large area with mercury potential and that was the area that I pointed out yesterday, where for area four there was a 90 percent chance of there being 30 or more deposits, 50 percent chance of there being seventy or more or a 10 percent chance of there being a 110 or more mercury deposits within all of area four.

Mr. HARVEY. Any more comments? Yes?

Mr. FISHER. Joe Fisher. To correct one statement that he said, the Salmon River platinum pay streak has been drilled out. We know it does go to Chagvan Bay. In respect to other placers in the area, particularly right in this proposed refuge area, in the Water Moose area on Water Moose Creek or the drainage of the Goodnews River, early gold mining was carried out there in the late thirties and early forties. Over in the Aralik drainage, mining was carried out in the late thirties and early forties on Snow Gulf, Cowcow Creek, Trail Creek, Butte Creek. Most of these gold operations were shut down by the War Board in 1942 and were never started up after the war. There's known gold placer deposits in these drainages and perhaps now with the price of gold, they would be commercial.

Mr. HARVEY. Yes?

Mr. LAMBETH. I do have one more comment to make to you. As everybody has pointed out, the mineral potential of this area is not very well known. Next summer the Bureau of Mines does expect to conduct a field program there to study the mineralization.

Mr. HARVEY. Yes, Dave?

Mr. HANSEN. From the mineral assessment standpoint, there are identified about 2.8 million acres of the 4.5 million acres of the Togiak area, which have some type of mineral value. Much of that has been mentioned as relates to placer in the lowlands and the river areas. The top half, looking at just rated in the top half of the mineralized areas of the State, about 800,000 acres of this 2.8 million acres is rated in the south half. About 162,000 are rated in the second percentile. Thank you.

Mr. HARVEY. Just for the record, I've been informed that the Alaska Power Administration has studied a bit on identifying some of the power sites around the State that are included in some of the (d)(2) proposals and we will get that for our files also.

Mr. FANKHAUSER. Bob Fankhauser, Alaska Miner's Association. I'd like to mention that I have worked for Resource Associates out of Fairbanks, which has done a couple of 2-year-long seasons of exploration in that general area, which were, as mentioned here, primarily oriented towards gold and mercury and we—this was in connection with parts of the Native Land Claims Settlement Act and while I can't go into details, they were successful in outlining several anomalous areas which are still being pursued for gold values. And I thought that it might be worthwhile to the Committee to know that this area does have a potential to attract private industry capital and should be of merit.

Transportation and Access

Mr. HARVEY. Thank you very much. Let's pick up now on the transportation access issues that we touched on a little bit earlier. You had something you wanted to say about that.

Mr. CURTIS. I'd like to make a very short pass up to the present, of transportation in the Togiak and including the Dillingham, but not over especially as far as King Salmon. Of course, the first method was walking or grabbing a log and——

Mr. HARVEY. Incidentally, to the Wood-Tikchik?

Mr. CURTIS. Yes. All the way on over.

Mr. HARVEY. Yes; this area here. Right.

Mr. CURTIS. OK. All the way on over. First, it was strictly by walking, and then they started using dogs. Then when the advent of mining and whatnot, they started using Cat trains. These were Caterpillars and that was their only sources, along with the shipping, after the shipping of stuff was brought from Seattle up to there, then they put it on Cat trains for these various mining or other villages for the fuel, when they started using fuel oil, and eventually the aircraft started supplanting the Cat trains. It was quicker, sometimes a little more expensive, but they didn't have the added expense of stockpiling stuff, like they do if they're using a Cat train. The villages over there, all those people are very nomadic, always have been. If there is some way in any of these bills that's going to inhibit the traveling, whether it's for commerce or for private, it is completely a total disservice. Did you say I should include Dillingham?

Mr. HARVEY. No, not really. Dillingham is——

Mr. CURTIS. OK. I won't include Dillingham. I'd say there is—the present population is in excess of 1,500 people. There are tremendous transportation problems that are still there. People just wouldn't realize it, because there are absolutely no roads. Absolutely everything except the sand and the rocks that go into the concrete is strictly brought in, everything.

Mr. HARVEY. Would I be correct in summarizing what you're saying, is that Congress needs to be sure that it allows airplanes, snowmobiles, and other forms of motorized use in areas where perhaps they wouldn't normally be allowed?

Mr. CURTIS. Yes; barges, any of the modes that they now have that would have to definitely remain.

Mr. HARVEY. Any other comments? Yes, go ahead.

Mr. FISHER. Joe Fisher of the Alaska Miner's Association. In this regard, the mines out there have relied solely on barges for the heavy equipment, airplanes for the lighter equipment and there were trails from Goodnews Bay, north into the Arolik country and trails from Goodnews Bay into the Water Moose area. There's air fields located at Water Moose and Cowcow and on the Arolik River and Snow Gulf.

Mr. HARVEY. Fine. Any other comments?

Mr. SILVER. Yes; I have one question for anybody. Does any part of the Togiak proposal there eyeball the protection staging area for OCS development in the future, either in the Bristol Bay or off into the lower Bering Sea?

Mr. HARVEY. Is anybody aware of that?

Mr. SISSON. Alex Sisson with the Alaska Oil & Gas Association. I don't know and I don't think anybody has actually pinned down an area that we are going to stage here or here or here. Unless the Bristol Bay people have, I don't know, but I would say on the tidal plain areas, those areas should be considered as areas—as staging areas which would not take an awful lot of room.

Mr. HARVEY. Any other questions? Yes, go ahead.

Mr. FISHER. In that regard, I might say that perhaps Goodnews Bay would be a likely spot. We are able to get in there with large tugs and barges and it has been historically used for such.

Mr. HARVEY. Jules Tileston.

Mr. TILESTON. I'd like to go to transportation and return to the offshore island thing. We bounced around and it came up again as we were talking. One of the bills discusses the definitions of rocks and spires as being automatically included and it also makes instant wilderness of this, and the issues that need to be resolved first of all, where those rocks and spires are, and I think you all have heard that there are some major discrepancies and misunderstandings on where these things are, just in terms of the actual bills. I think, basically, we've got an unknown.

The other thing is that the 6-mile limit is being tossed back and out and around those, and I'll give you a practical example. I'm a salmon fisherman. I sport fish in the Seward Bay area. I go to King's Head. You go around King's Head and within 200 yards is a spire. It's offshore, it's marine. It probably meets the definition that's in H.R. 39. I don't know whether it was on one of the red dots. It does have nesting birds on it. Can I or can I not troll by that in a motorized craft? And this is the type of issue that needs to be addressed throughout. Now, when we've addressed that type of thing traditionally in the wilderness system in the Lower 48, it has been on a case-by-case basis. We've covered two-thirds of the entire U.S. coastline this morning in less than 2 hours, and I would submit that is not enough to really address some of the issues here, so it's something that needs very, very careful attention, or we will have immediate and long-range conflicts.

Mr. HARVEY. We'll rest your mind a little bit. The proposals do allow a lot of motorized use, so I don't think you have to worry about that part of it. You may not know whether you're in a wilderness or not, but it won't matter, because you can still run your motor. Any more comments?

Mr. REFFALT. Bill Reffalt, Fish and Wildlife Service.

Mr. HARVEY. Yes, sir.

Mr. REFFALT. We do have one wilderness up here that does have that offshore boundary and I believe there are some fisheries going on. I think the basic determination that's been made is that unless the motorized use of the area by craft is actually causing physical damage to the submerged lands, that it is not an improper intrusion on the wilderness and would be continued. If such use were proven to be damaging the land, then whether it's a refuge or a wilderness doesn't make any difference. It would probably be regulated.

Mr. QUARLES. If I could clear this up, because I think there may be some confusion. That particular wilderness that you're talking about, the motorized use in that instance is allowed under the provisions of the Wilderness Act, which permits preexisting motorized use under discretionary purposes. Matter of fact, we have some legislative history in the committee report on that, and it is true that it's discretionary in the sense that—preexisting use is discretionary unless Congress and legislative history makes it less than discretionary under the existing Wilderness Act, but it is also—it gets us too separated. As Mike mentioned, there is also a proposal in most of the (d)(2) land bills to take that discretion away and say that motorized use is permitted. So it goes even beyond that one wilderness where the wilderness does include the field of water.

Mr. REFFALT. All right. I was speaking to the administration's proposal, which has the provision.

Mr. HARVEY. Any more comments on this? Yes?

Mr. FISHER. I'd like to get back to the minerals again and part of this is proprietary information on the minerals out there by the people that I've known that have worked in the area. There have been anomalous values found for lead, zinc, arsenic, copper, molybdenum, mercury, gold and platinum and there's known outcrops of——

Mr. HARVEY. Are you speaking of various places within the Togiak area?

Mr. FISHER. Within the Togiak Wildlife Refuge. There's an outcrop of zinc on the Togiak Wildlife Refuge. There's an outcrop of zinc on the Togiak River. There's an outcrop of lead and gold along the coast about 30 miles west of Togiak. There's a very high grade gold vein that's being explored west of Mount Avracia in the northern part, and in the belt of mountains to the west of Goodnews River, there's anomalous values of all of the mentioned minerals, plus this is one of the areas that is in the platinum metal belt.

ILIAMNA AREA

Mr. **HARVEY**. Well, I think it's time to switch to our last one for the morning session. That's the Iliamna area. If we could put up the map here. As you recall, we've drawn lines roughly here and we are not considering the Lake Clark area today, but just what we've outlined.

Mr. **STENMARK**. OK. We're going to figure on coming up to the Nondalton area.

Figure on coming as far north as roughly the Nondalton area, over to Cook Inlet and more or less along the divide between Iliamna Lake and Kukaklik Lake or in the Kvichak water shed. Further west, all of the Nushagak Drainage, east of the Wood River-Tikchik area, not quite as far north as where the Chilikadrotua and the Mulchatna come together.

Scenic, Landscape, Historic, and Archaeological Values

Mr. **HARVEY**. Thank you, Dick. Does someone want to lead off on the scenic, landscape, historic values?

Mr. **DAPKUS**. Dave Dapkus, Heritage Conservation and Recreation Service. I want to talk about one river and its tributaries that lie within that, just on the southern boundary really, and that's the Alagnak. Of course, it's a wild river. It has several values. One of its main values is its trophy fish. All five species of salmon run in there and as you'll hear from the biologists later, I'm sure, reds are the most important, but it also has good populations of rainbow trout, lake trout, grayling, and dolly varden, which make the fishing one of the outstanding river values there. It's also got a variety of wildlife and birds. Brown bear in particular and very large moose, and when I floated it the last time, we saw both eagles and swans, not in any great numbers, but it's kind of a variation that makes it really interesting. A third value is its recreational attributes. It's an excellent floating stream. For the most part, it's a family float stream, except right down in the canyon where it's got some class three white water and there is a raft or a good kayak would—a person with some experience is the only one that could make it through there.

It has good access from Kukaklek Lake, its start and the lower river. You can land anything up to the size of a goose in. Also along the upper part of the river and particularly lower on the lakes is good hiking, and its last value, I would say, would be its scenic value. The open tundra area around the lakes is beautiful. Then you—as you go down the river, you get into an incise canyon and after you're going through the canyon, you come out in a large open area of rolling tundra that's pretty much typical of this lakes area. So all in all, it has several values that make it an outstanding wild river. Thank you.

Mr. **HARVEY**. Thank you. Jack Hession.

Mr. **Hession**. Jack Hession, Alaska Coalition. Just a brief note on the rivers of the overall region. I think the focal point of recreation in the Iliamna area is on these rivers, both for sport fishing and for recreational purposes. In addition to the Alagnak, which by the way the Alaska coalition considers part of the Katmai area within the Kulik/Iliamna area, there are several other noteworthy streams feeding into Iliamna Lake. An example and one that has, I think, very high recreational potential for both the Iliamna and Lake Clark proposals, and that's the Newhalen River. The Newhalen is a marvelous, if I may use a subjective term like that, white water river that so far has not been investigated by Federal or State agencies. I'll let it go at that, except to say that again we're talking about river/lake systems and where you have that relationship, you generally have a superior type of recreational opportunities for the reasons that I mentioned earlier.

Mr. **Harvey**. Thank you. Anybody else want to talk about the scenic, landscape values?

Mr. **Heckert**. Larry Heckert with Fish and Game. I'd just like to say that the gentleman that just spoke to the interconnecting rivers versus streams is certainly correct in this general area of the Iliamna, the Alagnak, even the Katmai, for that example—in that case. But the majority of our fishing occurs in this interconnecting stream system and we do, in the Iliamna area, we have what we've designated within the Department as a trophy fishing area, because of the unusual quality of rainbow trout and the wide diversity of species, and it is an area that is of extremely high value to us. A good share of the fishing occurs from people coming in through the area. It's an extremely valuable area. The demand for this kind of a fishery is increasing and is going to continue, and a relatively small percentage of fishing occurs in the lakes, but it does occur within these interconnecting streams. The continued use of aircraft and motorized boats is going to be essential to maintain these fisheries. But they are quite similar throughout these generalized areas and we have high quality fisheries versus a light use fishery.

Mr. **Harvey**. Any other comments on the landscape, scenic values? Yes?

Wildlife and Fish Resources and Uses

Mr. **Fields**. Yes, Ed Fields, Alaska Miner's Association. I was wondering if you have any figures on the fishery usage, sport fish usage there, as well as State protected usage at some date in the future? Can you give us an idea of that?

Mr. **Harvey**. We can jump right into that when we get into the whole wildlife area. If you want to answer the question, we'll pick up on wildlife right now.

Mr. **Heckert**. Larry Heckert. We only have measurements of use on selected tributaries within that system. Talaric Creek, Copper River. These were conducted a couple of years ago and—but probably from this, we could extrapolate some kind of use figures for the area. It's probably important that probably the original attraction to the Iliamna area was the large rainbow trout, 15, 16 pound fish, unique in North America. But I think in the last several years, we've found that the angling effort has distributed itself out, radiated out of this area for other species of fish. But in general, probably we're talking several thousand man-days a year in this generalized area.

Mr. HARVEY. Any other comments, now, on the wildlife area, on the species, hunting and fishing, et cetera, in the area? Yes, go ahead.

Mr. SCHMIDT. Ted Schmidt, U.S. Fish and Wildlife Service. I just have some general comments on the wildlife and fishery in the area. The Bristol Bay lowlands provides a habitat for a wide variety of marsh and water birds and the waterfowl population in the area, principally ducks, is estimated to be 350,000 birds and we have 10,000 swans. We have a fall flight of approximately 370,000 ducks and 12,000 swans produced on the area. Some of the principle duck species there are scaup, scoter, oldsquaw, pintail, mallard, greenwinged teal, widgeon, goldeneye, merganser, and gadwall. A variety of other marsh and water birds on the area, with a total of 135 bird species that have been identified on the area. Large mammals in the area include moose, caribou, brown bear, black bear, wolves, and wolverines. It is a fairly productive country for small game and furbearers. One of the unique features of the Iliamna area is an inland seal population. One of possibly two in the entire world. Population estimates are between 150 to 300 animals in this lake. Beluga whales swim the Kuichak River for approximately 68 miles, following the smelt runs. On the fisheries values, the area provides 16 percent of the world's commercial red salmon catch and this, in the past, has shown an average of about $12 million as far as commercial value. I have a list here of some of the trophy sport fishing areas that I can provide the committee, but I won't go through them.

Mr. HARVEY. Good. Is that it? Any other comments? Yes, the State.

Mr. FERRILL. Jim Ferrill, Alaska Department of Fish and Game. The area being discussed is—has certain differences when you come up from the Nushagak to the Iliamna drainages and what-have-you, and with moose, it is probably most evident. On the Iliamna drainages of this area, there is a moderate moose population, not particularly high density, which are producing about a hundred animals annually in the sport harvest and probably that many more going to local residents for domestic meat needs. On the Nushagak side, there is a greatly reduced moose population that has been declining and appears to be continuing to decline, although we do not have good hard data in the area. The appearances are that the continued late winter harvesting in that area is reducing that population, and this is being taken by local residents for domestic use or for subsistence. Subsistence surveys done by the University of Alaska indicate that in excess of a hundred moose annually are taken during the winter.

The Mulchatna caribou herd ranges through this area. In the Iliamna country, it comes down in the summers in small numbers, but some winters, comes down in excess of 3,000 or more animals. They then range out of the area, continuing on up into the area which is being considered for lake parks and what-have-you, so you have a migration crossing both State, private and Federal land ownerships, which is going to be a factor in the management of this herd.

The past recreational use of the Mulchatna caribou herd has been very heavy and it has occurred primarily outside of the boundaries being discussed here. In the fall, there is a recreational harvest, which is light and is not particularly scattered in any one area and is scattered throughout the entire area, wherever the caribou might happen to be at that moment. The past heavy harvests which occurred have occurred with the use of snowmachines, individuals traveling sometimes great distances, from as far as Togiak to Goodnews Bay, to hunt this particular group of animals and with aircraft coming on over and hunting in the winter when snow conditions are right.

Brown bear occur throughout the area in pretty good numbers, particularly in the Iliamna and the Cook Inlet drainages. There is extended movement of the individuals crossing drainages, both between Nushagak and the Ilimna drainages and Cook Inlet. We have some documented proof of this movement, due to the bears which were worked at McNeil River State game sanctuary and tagged. These animals have been identified along the Copper River and other areas. Trapping within the Iliamna portion of the area is an important resource. It takes all species of furbearers that are there. Again, it is a commercial harvest. Within the Nushagak drainages, which were identified, trapping is also very important, but there similar to the Togiak Refuge Area, the trapping pressure has reduced the beaver population in much of the area and it's only now to the point where we're considering reopening it. Again, I'd like to stress that this trapping is commercial trapping by local residents. There are almost no trappers from outside the area utilizing the resource. And it is done for dollars, which they use to supplement their income.

Mr. HARVEY. Thank you. Any other comments?

Mr. HANSEN. Looking at the overall wildlife habitat from the State's wide standpoint, about 2.5 million acres of the proposal area, which was around 6.2 million acres, is in the top half of the wildlife habitat for the State and 300,000 acres of this 6.2 million acres is in the third 10 percentile for wildlife habitat.

Mr. HARVEY. OK, Jules?

Mr. TILESTON. Jules Tileston, BLM. Dave, what percentage of that is in State or Native ownership at this time, or do you expect to be?

Mr. HANSEN. The Natives have selected 70 percent of the top 10 percent. In other words, they've selected the majority of the land that's the best wildlife habitat. Of the total wildlife habitat in the area, the Natives have—well, they've selected 66 percent of the area.

Mr. HARVEY. It would appear that the State and the Natives are going to own the whole shoreline. Well, just about.

Mr. HANSEN. I hope we have it the way we want it, anyway.

Mr. HARVEY. Any other comments on the wildlife? Yes?

Mr. RANDALL. Richard Randall, Commercial Fisheries, Alaska Department of Fish and Game. Some figures have already been included as far as the historic production and the average economic values, but I wanted to also include some comments on the amount of effort that exists within the commercial and the subsistence fishery in the Iliamna Area. This—at the current time, the upper levels include about 800 drift fishermen and about 200 setnet fishermen, all operating within the Naknek, Kvichak District, and for management purposes, it's just about impossible to separate the management programs of the fisheries in the Iliamna system from the Naknek system, because the harvest takes place out in the bay, itself.

For our purposes, we combine these two together and the subsistence harvest within the Iliamna/Naknek system includes about 80,000 salmon of all species for those two systems.

Mr. HARVEY. Any more comments on wildlife?

Mr. EATON. I'd like to make a comment in regard to the statement you made on the Native selecting along the coastline. This is merely in keeping with their lifestyle and much of the land that they selected was not on the basis of being able to develop it industrially or otherwise, it was strictly on subsistence. I just wanted to make that clear to some of these people who seem to think that they've selected it because it's coastline.

Mr. HARVEY. Well, I was just making an observation of facts. Any other comments? All right. Let's go on to the renewable resource area, timber, agriculture, and grazing. Dave.

Renewable Resources

Mr. HANSEN. In the area of agriculture, nongrazing agriculture, close to a million of the State's 18 million acres of agriculture potential are found in this area. About 80 percent of this million acres in the Iliamna Area are rated in the top half of the State's agriculture potential. When your're talking about 18 million acres, it's very significant.

Mr. HARVEY. Is that mainly in the western portion, away form the lake, or is that——

Mr. HANSEN. Jim, would you point out the high agriculture potential over there? I believe it's to the west, yes. It runs between the Wood-tikchik and——

Mr. HARVEY. Yes; that's what I thought. I just wanted to make sure there were no drainage areas.

Mr. HANSEN. The Natives have selected 561,000 of this close to a million acres of agriculture potential land, but it is very significant from a Statewide perspective toward agricultural values. In the area of forestry, 1.7 million acres of the area's 6 million acres have some forestry potential, but it's all rated in the 9th and 10th percentiles, so those are patches that have some value. Overall, it doesn't rank that high on a Statewide basis.

Mr. HARVEY. Yes?

Mr. EPPS. Alan Epps, Cooperative Extension. I'd like to just simply speak to both of these briefly. The area, as David pointed out, does have considerable agriculture potential, particularly again from the bearing standpoint of the grazing animals that are domestic. This area probably does not have good potential from a reindeer standpoint, because of the conflict with the Mulchatna caribou herd, but this is one of the areas that probably would not be looked to strongly from a reindeer standpoint. Relative to the forestry, part of the low grade on the forestry at the present time is due to the management that has been practiced there, which is non. Mother Nature has been doing the management at this point and with proper management, though, there is a feeling that they could increase the production in this area.

State and Native Land Selections

Mr. Harvey. Any other comments on this renewable resource area? OK, let's review quickly. We've already done to a considerable extent, the non-Federal land situation, State, Native, et cetera. Go ahead, Dave.

Mr. Hansen. The State currently owns about 123,000 acres of this 6 million acre area. We have interest in about 3 million acres, which we have rated in our highest priority category for selection in the area. The reasons we are interested in it have to do with the high values for settlement, proximity to the lake, possible road corridors, high fishery values, high mineral potential, agricultural potential and just overall more intensive use potential, especially when you look at the entire State of Alaska. This is going to be an area that's accessible and can be very considerably developed for many uses. The Native corporations, as I mentioned earlier, have selected 4.1 million acres of the 6.2 million acres in the area. They will be retaining a large portion of that. I guess that's all I have to say.

Mr. Harvey. Are there any other comments on the selection situation? OK.

Mr. Hession. Jack Hession, Alaska Coalition. I'd like to ask Mr. Hansen how his observation that the Iliamna area would be subject, perhaps, to more intensive uses square with the habitat requirements of these wilderness species that we've been discussing?

Mr. Hansen. Well, I'll tell you my rationale for making that statement, and it has to do with the proximity to the main population centers of the State and the fast expansion that's taking place. It also takes into consideration the fact that on a Statewide basis, there are few areas that have the types of potential of settlement, agriculture and more intensive uses in the entire State that come close to what you have around Lake Iliamna. As well as a lake of this size having the mixed land patterns, where the Native corporations already own a good part of the lake frontage and the general area. From a recreation standpoint, with its potential that way and already having this much private ownership, it's a natural place for the State ownership to complement it on the development of its overall recreation potential.

Mr. Hession. But would you not agree that there is an inherent conflict in the sort of uses you outlined in the acknowledged high wildlife, recreational and natural values?

Mr. Hansen. I think there are some conflicts, depending upon how you look at it in time. We are speculating over the next 50 to 100 years and how long the—you know, that's the question you're talking about. If everything I talked about right now was happening today, there's an enormous conflict, yes.

Energy Resources

Mr. HARVEY. Any other observations on this particular subject? All right. Let's get into the energy area. Do we have some comments about that? Go ahead.

Mr. SISSON. Alex Sisson with the Alaska Oil and Gas Association. The Iliamna Wildlife Range area has two areas of conflict, one on the east and one on the west, as far as sedimentary basins are concerned for potential oil and gas and hydro power potential. On the west, the so-called Bristol Bay Basin, and which the Ugashik River goes up to the northwest. Unashak River, excuse me. This area is pretty much of an unknown as far as a petroleum geologist or petroleum geology is concerned, because of a lack of the outcrops in the area. The areas, as you well know from the maps here, is fairly flat. A number of wells have been drilled in the area, which indicate a possibility of 5 to 6,000 feet of Tertiary sediment overlying possible Mesozoic sediment, which also could have some oil and gas possibilities. This area, we would like to see some areas this portion opened to oil and gas exploration. To the east on the peninsula, the (indecipherable) peninsula here, there are not only oil seeps, there are anticlines and there is a fairly good possibility for oil and gas. Here, the middle and upper Jurassic is exposed and there is a large well documented anticline called Tiksquik Anticline, which does have over to the south and the southeast of it, there are oil seeps. This is one area we would like to be involved in.

Mr. HARVEY. OK. Any other comments on the energy aspects from the Bureau of Mines?

Mr. LAMBETH. There is a potential for geothermal energy in the area, evident from the relationship to Augustine and other volcanic vents. At the turn of the century, some oil wells drilled on the Alaskan Peninsula, intersected steam, I believe, at a depth of 8,000 feet.

Mr. HARVEY. OK. Yes?

Mr. BISHOP. Don Bishop of the Bristol Bay Native Corporation. If I understand Mr. Sisson right, he said there were five wells drilled, meaning on the Cook Inlet side?

Mr. SISSON. On the Cook Inlet side. No, I said five thousand feet of possible Tertiary sediment in the——

Mr. BISHOP. On the western side of Iliamna Lake, there's a large area there, but not that I agree with that unknown thickness, but there have been no wells drilled there. In fact, I think I've heard of a water well that maybe got 400 feet deep, so there are many unknowns and again, that same area which is outlined by—I can't really change it, but outlined by the U.S. Geological Survey in 1957, I believe, and that doesn't really change the outline very much, but until we know more. But that same area would also have sedimentary and uranium potentials.

Mr. HARVEY. Any other comments. Yes, Dave?

Mr. HANSEN. Yes. From a statewide perspective, this area does rate quite high for oil and gas potential. In the top 20 percent of the State's oil and gas potential, you have 23,000 acres, which are located in the Lake Iliamna area. You have an additional 1.9 million acres which are in the top 30 and 40 percentile on a statewide basis for oil and gas and we look at the top 40 percent as being quite significant. Total in the area, you have 2.6 million acres which have some potential. Jim, perhaps you could mention briefly where the highest potential is. It might have already been pointed out pretty well.

Mr. **Wickes**. The general area for the middle range oil and gas values that Dave just mentioned would be just inland from the Bristol Bay and that large sedimentary basin that's generally well identified on both oil and gas maps. The area of particularly high value would be probably over on the Cook Inlet side of Lake Iliamna.

Mr. **Hansen**. In the area of uranium potential, there are about 3.1 million acres that are noted as having some uranium potential, but they're all ranked, again, No. 5 of five categories, so it's fairly low and part of a large rating of uranium potential. Thank you.

Mr. **Harvey**. Yes?

Mr. **Reffalt**. Bill Reffalt, Fish and Wildlife. Dave, is it correct, about 80 percent of that oil and gas has been selected and about 80 percent of the uranium has been selected by the Natives at this point?

Mr. **Hansen**. About 80 percent of the total oil and gas lands have been selected by the Natives. Eighty-six percent of the best oil and gas has been selected by the Natives. The uranium, also about 80 percent. I think we're reading from the same figures.

Mr. **Fields**. Not quite. OK. In relation to the oil and gas, it appears that—we've gotten some pretty good indications of at least good potential for oil and gas in there and I think it's important to maintain an access route from the Cook Inlet over to the Iliamna area, in the event that this does become productive at some stage in the future and we want to keep this in mind in terms of some kind of a corridor access in there.

Mr. **Harvey**. OK. Any other comments on that issue?

Mr. **Hansen**. I might just further emphasize that from the State's standpoint, we agree very much that this is a natural area. We're looking at future transportation of resources such as this, which is one of the reasons we have indicated it as a high selection interest.

Nonfuel Mineral Resources

Mr. **Harvey**. Any other energy comments? All right. Let's—I don't think there are any hard minerals out in this area, are there, at all? I'm just kidding. Let's get into the mineral area.

Mr. **Singer**. Don Singer, U.S.G.S. We've delineated two areas that are favorable for minerals in this area. One of them is east of Lake Iliamna, along—it runs north-south along the bay or the inlet there. This particular area is favorable for a variety of mineral deposits. I'll list some of the larger ones. The copper skarn deposits, which contain copper, iron, sometimes gold and silver. We estimate there's a 90-percent chance for 5 or more deposits, 50-percent chance that there are 7 or more deposits and a 10-percent chance that there are seven—or 10 or more deposits on this side. The grade-tonnage figure was introduced yesterday. The second deposit type in this area is magnetic titaniferous magnetite deposits, that is, an iron deposit. These tend to be low grade. By low grade, I mean 12 to 13 percent iron. We have an estimated number of deposits of this type also, 90-percent chance of 11 deposits, 50-percent chance of 12 or more deposits and a 10-percent chance of 14 or more deposits. There is potential for porphyry copper deposits in this area, with favorable geology plus fairly scant exploration for this type of deposit. Our estimate is a 90-percent chance that there are one or more deposits of this type, 50-percent chance of two or more deposits and a 10-percent chance of six or more deposits. There are two possible intrusive (indecipherable) deposits, containing copper, gold, silver. There is potential for porphyry molybdenum deposits.

We estimate there is a 90-percent chance that there is one or more deposits, a 50-percent chance that there are two or more deposits and a 10-percent chance that there are three or more deposits. This particular deposit type, we have not given grade-tonnage numbers for, so I will briefly here. Ninety percent of this type of deposit—deposits 1.6 million tons or more, 50 percent have 24 million tons or more, 10 percent have 340 million tons or more. Ten percent of the deposits have grades of .065 percent Mo or more, 50 percent have grades of 0.13 percent Mo or more, and there is not a correlation between grade and tonnage.

Now, the area I mentioned and the numbers apply to the whole of our area 7, only part of which—approximately half of which is in this region we're considering right now. The other mineralized area, favorable area that is involved here is our area 6, and again only part of area 6 is involved within the region we're considering today, and that area is north of Iliamna Lake in this case. This particular region has, again, potential for copper skarn deposits and there is one known that is really significant. It has probable breccia pipe deposits and/or veins, containing copper and silver and it has porphyry copper deposit potential. In this case, we estimate that there is a 90-percent chance that there is at least one deposit in this area, a 50-percent chance that there are three or more deposits and a 10-percent chance that there are eight or more deposits. It has again potential for porphyry and molybdenum deposits. In this case, we think there's a 90-percent chance that there are zero or more deposits, a 50-percent chance that there is one or more deposits and a 10-percent chance that there are three or more deposits.

There is also a potential for what are called replacement type deposits, with copper, gold and silver, and there is a potential for felsic and intermediate volcanogenic deposits, and the area is favorable for this particular type of deposit. There are several deposits—there are several known deposits that may belong to this category. They haven't been fully examined. Thank you.

Mr. HARVEY. Are there any other comments? Yes, go ahead.

Mr. LAMBETH. Bob Lambeth, Bureau of Mines. The only thing I might add is that from several of the claims to the east of the lake, there was production in the past. One mine went so far as to bring in a small mill, I believe it was around 1920. One deposit not too far from the mouth of the Newhalen River has been diamond drilled.

Mr. FIELDS. Ed Fields, with the Alaska Miners' Association. Suffice it to say that there is a large number of prospects up and down the

Alaska Peninsula which outline a mineral belt that trends up the Alaska Peninsula and into this area. This is one of the more highly mineralized regions along this belt of land on the peninsula. I might make a comment in relation to the fact that many of these mines and prospects in the area are not operating at the present time or were very small prospects in the past. The faith of the exploration geologists in these areas is demonstrated by the fact of the very high increase in the rate of exploration dollars that are spent each year for the 1950's period, 1950 to 1960, was something on an average of $1.7 million per year. During the period of 1960 to 1970, exploration expenditures averaged on the order of about $3.5 million per year. Presently, in the 1970's, it's up to $15 million per year average, so you can see that there is an increase in interests focused in the State.

Mr. HARVEY. Thank you. Any other comments?

Mr. FANKHAUSER. My name is Bob Fankhauser of the Alaska Miners' Association. I would like to add a little bit of emphasis just on having been on the grounds in this area for a couple of field seasons, and I would like to emphasize the potential for porphyry types of deposits down here and also along with the line of thinking of——

Mr. HARVEY. You're speaking of that area, now, north of the lakes?

Mr. FANKHAUSER. I'm talking mainly in the coastal range belt of intrusives which does, as I have mentioned, extend both north and south of the lake. One—a couple of points I'd like to make first of all, is that this area has received mostly—most exploration has been for prophyry copper type deposits or skarn-type deposits or magnetite deposits. I think two other types of deposits that would be a viable prospect in the future, from my experience on the ground, is volcanogenic-type gold deposits, which are associated with both the Jurassic volcanics down there and also the Tertiary volcanics and we have established that these, in fact, do exist. None of them are in production, but the geology and the environment for such is favorable, and along the same lines, uranium is another possibility that's just coming into light in the new type of deposits, both basal uranium deposits or by the high volcanic source rocks, uranium is leached from that and deposited in underlying foreset conglomerates and sandstones, and this also is a possibility which has been demonstrated as favorable prospect in this area.

Transportation and Access

Mr. HARVEY. Thank you. Any other comments on mineral development prospects? How about our transportation, access issue? Does anyone want to comment on that? Yes, sir?

Mr. WILSON. Maurice Wilson, Department of Transportation. In addition to the corridors shown on the overlay, I'd like to point out that there is a portion of the Federal aid system route as of yet unconstructed between Iliamna and Nondalton, and this does require a crossing of the Newhalen and I believe the right of way has been acquired for this route.

Mr. Harvey. Any other comments? No one sees any potential conflict between the fishery resource and the mineral development, or maybe there isn't any.

Mr. Hession. Jack Hession, Alaska Coalition.

Mr. Harvey. Yes, sir.

Mr. Hession. I believe there is a highly significant one, Mr. Harvey, with regard to the north Katmai, south Iliamna area. Did you want to take that up in the context of Iliamna or Katmai?

Mr. Harvey. Let's do it on Katmai.

Mr. Hansen. Mr. Chairman, just for the record, the State, of course, values extremely highly the entire watershed going down from Iliamna as far as supporting our commercial fisheries industry in the Bristol Bay area, and I've made it quite clear that our management policies of land that we will own in this area will very much focus on the protection of that particular resource as far as with other noncompatible or compatible activities.

Mr. Harvey. Does the State plan to take any kind of legislative or other regulatory action that would provide that kind of protection on lands you do not own?

Mr. Hansen. Well, we have several authorities that protect streams as it is, both from a pollution and from a Fish and Game standpoint.

Mr. Harvey. So you have existing authority that you could use?

Mr. Hansen [continuing]. These are in existence right now, and what you say is correct.

Mr. Fields. I would say that there aren't any—that these two types of uses are compatible in terms of mineral development and fishery down there. When you look at the number of regulations, the BLM Organic Act, the Clean Air and Water Act, these are very restrictive in nature and they are applicable to any and all operations that are put into production in the inland areas, so these regulations do apply and they are adhered to.

Mr. Harvey. Thank you.

Mr. Gunlogson. Dick Gunlogson, Alaska Professional Hunters. We do have a few comments that would apply to this area; however, they're as applicable to the Katmai area, and we can avoid repetition by doing them together at that time.

Mr. Harvey. All right. Fine.

Mr. Hession. I had forgotten to mention earlier in the general character of natural values that the B.O.R. has studied two additional rivers in the Iliamna area and found them to be fully qualified for inclusion in the wild and scenic rivers system. Those are the Nukakuk and the upper Iliamna and, of course, Mr. Hansen didn't mention them because the administration—present administration hasn't included them. But that means that 3 out of approximately 23 rivers now being proposed by the administration are centered in the Iliamna area and that, in turn, is an indication of the extremely high quality of the river resources there.

KATMAI AREA

Scenic, Landscape, Historic, and Archeological Values

Mr. HARVEY. All right. Our first subject is the scenic, landscape values. Who wants to take the first shot at that one?

Mr. BLINN. Gil Blinn with the National Park Service. The Katmai area has a number of fine resource values and scenic values are only one, perhaps not even the most important but, nevertheless, they are significant in that you have a number of crystal-clear lakes there, with your snowcapped peaks and your mountain systems, confined rivers. Most of them clear with good sports fishing and some of the rivers, most notably the Alagnak, offers some good boat opportunities for boat drifting. Your vegetation ranges from some forest at American Creek and tundra and then, of course, the rocks and glacier in the higher country. But here you have an area where the scenery is largely undisturbed by man, pretty much in a natural state. The forest offers a scene, in itself. The tundra offers some good chances for alpine hiking and the high country experience that comes in that environment. Throughout the area, you find very little development. What you do find primarily is a few fishing lodges, where the high quality fishing is emphasized. So we feel that there are some significant scenic values there.

Mr. TILESTON. Jules Tileston, BLM. The American Creek has been recommended, but there is one major problem with it and that is that it does not have a tremendous volume of water in it. I would describe it based on the work I've done in Alaska as an excellent whitewater hiking stream, because that's what you're going to do for the best percentage of it. It's very shallow, good flow, excellent fishery, excellent scenery, but it really is not a good boating area, simply because the water is very rugged and very shallow and lots of boulders.

Mr. HARVEY. Yes? The gentleman in the back.

Mr. LEEDY. Bob Leedy, for the Fish and Wildlife Service. I'd like to speak specifically to the area south of the existing Katmai Park, the administration's proposed Becharof Refuge. The topography of the area is characterized by volcanic mountains to the east and low rolling hills and tundra wetlands to the west. The vegetation consists primarily of alpine and lowland tundra. The one exception might be groves of cottonwood in the Kejulik Valley, which provide a very soft, pleasing contrast to the otherwise treeless landscape. The very southern tip of the lake, the so-called island arm of Becharof Lake, is surrounded by majestic mountains, the most imposing of which is Mount Peulik and almost perfect cylindrical cones. A protected bay, dotted with many islands and is certainly of outstanding scenic value.

Mr. HARVEY. Going on to the next area, which is the Katmai area, and I would request Dick Stenmark to lay out the perimeters of the area we'll be talking about and then we'll throw open the discussion. Dick.

Mr. **Stenmark**. All right. Basically, the lands that we'll be discussing relative to the Katmai area will be those from the divide just south of Iliamna Lake, down to the existing monument and from the existing monument, south to Becharof Lake on the north side and around to the east side, down to about Portage Bay. So anything within that zone, if you'd kind of limit your remarks to that general area. Following this, then, we'll probably do the rest of the Alaska Peninsula from Becharof Lake southward to False Pass, including the Aniakchak area in that too.

Wildlife and Fish Resources and Uses

Mr. **Harvey**. Anybody else? All right. Let's get into the wildlife values in the area, various species, habitat, use patterns and so on. Do you want to kick it off?

Mr. **Leedy**. I'll start off with a general introduction, yes. The upper peninsula area contains at least 29 species of land mammals, 6 species of marine mammals, 28 species of fish, and 137 species of birds.

Mr. **Harvey**. When you refer to the upper peninsula area, now, you're referring to the higher, upper areas of the Alaska Peninsula or are you speaking of the specific addition to the——

Mr. **Leedy**. At this point, I'm speaking of the general area.

Mr. **Harvey**. The upper Alaska Peninsula?

Mr. **Leedy**. Yes.

Mr. **Harvey**. Right.

Mr. **Leedy**. And with the indication that most of these same number of species would be found in this area. The proposal includes what is perhaps among the best remaining habitat of brown grizzly bear in Alaska, it contains healthy populations of moose and seasonal populations of caribou. The streams have a good number of salmon, rainbow trout, dolly varden, and grayling, and the tundra lowlands and coastal estuaries are important for breeding and migrant waterfowl. Rocky sea cliffs and islands support hundreds—up to hundreds of thousands of sea birds, primarily murres and kittiwakes, and many thousands of marine mammals. I'd say perhaps the greatest values of the proposal area are the major spawning habitat for red salmon, along the southeastern arm of Becharof Lake, and one of the densest populations of brown bear known to exist. Probably the most work with bears that has been done to date in the area has been done by Will Troyer of the Park Service, and I think it would be appropriate for Will to speak to the bear resource.

Mr. **Harvey**. All right. Go ahead.

Mr. **Troyer**. I'm Will Troyer, wildlife biologist for the National Park Service. I've done considerable bear research in that area, such as Kodiak Island and other parts of the Alaska Peninsula, too. I'd like to emphasize the importance of the area on the lower southeast corner of Becharof Lake, which Mr. Leedy has referred to. It starts with Becharof Creek, Bear Creek, Salmon Creek, Cleo Creek, Otter Creek and on down to the last little stream at the extreme headwaters there. I believe it's unnamed, below Ruth Lake. But this particular area, I consider one of the most concentrated bear concentrations that I've ever seen in Alaska and it rivals anything we have in the Kodiak National Wildlife Refuge, which I'm very familiar with, at the time. I have done considerable aerial bear surveys during the period when they concentrate on the streams and as many of you know, it's impossible to get an estimate figure from aerial surveys, because you never see all the bear at the same time, but I have on a number of occasions and in a little over an hour of flying have counted over 100 bear. For instance, on Bear Creek, I have in one flight seen as high as 44 bear on that single stream, 27 on Salmon Creek. I could go on and mention these others, but what I'd like to emphasize is that the bears, starting at Becharof Creek down to that tip, is one of the densest populations we have, but also that the region is—along the edge of the lake and on up into Kejulik drainage, it's a whole series of bear trails and there's a lot of interchange of the population and it's going to be extremely important if you start to cut that area apart in different types of uses, because of the fact that bears do interchange between these drainages and have a considerable movement in the area, and we're really concerned about the bears in this area and are interested in preserving them.

We can't just set aside one little drainage in one spot and one in another and then figure we're going to have bears there in the future. They're going to disappear like they have in other places. It's absolutely essential, when you're working in a population such as brown bear, who are dependent on a wilderness environment where they're not harassed by humans and so forth, that we do set aside large areas and so I'd like to emphasize the extreme value of this area. Somebody else will probably talk about the fishery. Each one of these streams that I've mentioned is also very important as far as the salmon spawning grounds, and I'm sure the Alaska Department of Fish and Game has better figures than I do on that.

One other emphasis I'd like to make, and I think Jim Ferrill may speak to this, but there are only a few areas in this area where we have late spawning salmon, I'm talking about October, November, where bears concentrate and feed, and I understand Ruth Lake is one of these, as well as we have one at Brooks Lake, itself, Brooks Creek and also over in the stream between—I can't see the map there, but it's not that one.

UNIDENTIFIED VOICE. Nonvainuk?

Mr. TROYER. Nonvianuk Lake there, yes. These three areas are very, very important because of that late spawning stream. We do have some excellent bear habitat in the Katmai National Monument now, along the coast, in the bays, around the Naknek system and so forth. But the American River, which is also proposed for inclusion, is also one of the areas that's very, very important.

I did a series of surveys in there for the past few years and in order to get some kind of an idea of minimum populations the summer before last, I flew it every 2 hours all day long in 1 day and came up with an absolute minimum of 25 bears using that river at that period of time during that day, and that's a very minimum. And there again, denning along the right-hand side along the ridges, Jim Ferrill and I did a denning survey of this area, too, and this happens to be a very important bear denning area, as well as, somebody mentioned the islands down in Becharof Lake. These are rather unique, because it's very rarely that we find bear dens below the 1,000- to 1,500-foot level, but when we did the survey, we found 14 dens on the islands, themselves, many of them within 20 feet of the water line there.

Right now, I think that's all I'll emphasize on the brown bear. Somebody else wants to talk about wildlife. Yes?

Mr. **Leedy.** Yes. I'd like to follow specific areas within the peninsula, of which Becharof Lake is very notable, are among the only three areas in the State of Alaska that have dense concentrations of brown bear. The others being Admiralty Island and Kodiak Island, and of these three primary brown bear areas, the Alaska Peninsula at present has the least disturbance and fewer settlements than any of the areas. For instance, in the proposed refuge, there are presently no settlements, no grazing, no residences, and no transportation corridors. And also the point should be made that bears use resources of the entire area. While they concentrate during red salmon spawning season on the streams coming out of the Aleutian Range there, the coastal mountains, they range over the period of the year from coast to coast across the peninsula.

I imagine Mr. Ferrill will have far more to say on the moose and caribou than I will, so I'll just suggest that the waterfowl, while of secondary importance, perhaps, in the area, to some of the large mammal population, do nest in the coastal lowlands on the edge of the area we've defined here in moderate densities, approaching 32 nesting birds per square mile. Also, whistling swans are common breeders and sand hill cranes and a variety of shore birds are also found nesting in the area.

Mr. **Harvey.** Any other comments?

Mr. **Waldrop.** All I can do is confirm with our computers what the Fish and Game and Fish and Wildlife Service people have pointed out, and that is that it ranks extremely high on a statewide basis with fish and wildlife values. We have identified about 900,000 acres of the 1.1 million included in the Andrews Proposal that rank in the upper 5 percentile. The same with the fish, roughly the same figures, 900,000 acres or so rank in the upper 5 percentile.

Mr. **Harvey.** Yes?

Mr. **Randall.** Richard Randall, Alaska Department of Fish and Game. I'd like to elaborate a little bit more specifically on the fisheries resources and specifically, the subsistence and commercial utilization of the resources within the existing Katmai boundry and proposed extension. The monument as it exists now and the proposed extensions include the majority of the spawning habitat of two of Bristol Bay's major river systems, the Naknek and the Egegik Rivers, and at the present time, there's both a commercial and subsistence fishery operating on all five species of salmon which, incidentally, spawn within the confines of this proposed boundary and currently the commercial harvest in the Naknek/Kvichak District is in excess of 400—4 million fish of all five species in the last 20 years.

About 15 percent of that can be attributed to the Naknek system. To the south, the other major fishery that operates on the south bounds of these areas is the Egegik District, which are bounds for the Becharof system, and average commercial harvests in this area are in excess of 1 million fish of all five species, and we have escapement requirements that we've established for both of these systems based on historic production levels of these two systems. At present, our sockeye salmon escapement goal for the Naknek system, 800,000 per year and the Egegik River, draining from the Becharof system, is 600,000. So as you can see, it's a very sizable fishery resource. The subsistence utilization is minimal in the Becharof system, but includes about 15 percent of all the subsistence harvest from the Naknek/Quinhagak Drainage. As I mentioned earlier this morning, it's on the Iliamna system. I think the important thing——

Mr. HARVEY. Subsistence on the fish?

Mr. RANDALL. Right, salmon primarily, right. Just fishery. I'm limiting my comments to the subsistence and commercial fishery resources, and I think the important thing to point out here of our concern is that both of these fisheries occur in adjacence right up to and in near proximity to the existing and proposed boundary lines, and that we currently have two field stations located within the proposed extension of the southern boundary and we also have one right near the existing boundaries of Katmai on the west side of the Naknek River, and these are important to us, because even though the harvest of the resource occurs in the commercial and subsistence areas outside of the boundary, the ability to manage the resource from an overall standpoint requires the ability to monitor both now and in the future, the size of the resource on the spawning grounds also.

We do conduct resource assessments above the commercial fishery and monitor escapement from year to year also. So these things are essential to long-term manageability of the resource. I think probably some of our sport fish people and Jim Ferrill would like to comment also on the game resources of interest to the Department of Fish and Game also.

Mr. HARVEY. Yes, go ahead.

Mr. HECKERT. I'm Larry Heckert with the Sport Fish Division, Alaska Fish and Game. I won't speak to the anadromous species, since Rich has, but it's probably worthy of note that the same fish—salmon species that are desirable in the commercial fishery, depending on where they—where the sport fishermen intercept them, they are certainly desirable also. The Alagnak Branch river is one where sport fishermen currently utilize the kings. It's an excellent float system and it's one of the better fisheries out there for anadromous species. The Alagnak branch system, outside the existing park boundary within the extension area, is currently what we call our trophy trout area, with recognition of good trout, rainbow trout stocks. In addition to that, these areas, the Nonvianuk area, all have excellent fly-in fishery. it has to be some of the finest quality sport fishing areas available. There are a number of guides who operate within the area. It's simply quality fishing, recreational fishing. It offers an esthetic experience and it's good fishing. One of the areas that is somewhat different in that it is not a fly-in fishery, is the sport fishery that occurs at the mouth of the Naknek Lake or at the outlet of Naknek Lake.

Primarily, the residents of the King salmon area utilize this fishery from late spring into early winter. It's largely a drive to the end of the road. Most motorized water craft can fish in the Naknek river, right just below the outlet to the lake. It's a very successful fishery, with good stocks of fish. it's an extremely good one. Probably some of the largest rainbow trout available to sport fishermen occur right in the Naknek River. We have a State trophy fish program, which also gives recognition to large fish. Almost all resident rainbow come from the Naknek. We feel there's potential for even increased fishing effort and particularly if we can get into some of the other species. If we go further southward, then, on toward the Becharof, the recreational fishing occurs at sporadic areas at seasonal times. It's all fly-in fishery. The use is rather light. It's an area where again, dependence is on maintaining these fisheries is entirely on the continued use of aircraft and/or motorized boats. We feel there's considerable potential for future fishing effort in this lower area. It's all what we would term quality fishing area. It's growing in demand and particularly as the competition for fishing space becomes more abutted on this side of the mountain range. It's utilized both by nonresident anglers from out of State and anglers flying out from Anchorage and population centers here.

Mr. HARVEY. Any other comments from non-Government people?

Mr. EATON. Is this strictly to the northern portion of Katmai or all portions of these areas? I note that all of the comments have been directed to all of it. I'm not familiar with the areas you're speaking about, but I am on the Shelikof side and is it all right if I make a comment or two about that?

Mr. HARVEY. You sure may.

Mr. EATON. Thank you. Hank Eaton, Kodiak. I'm with the Koniag Native Corp. The areas below Cape Douglas have been traditionally fishing grounds of the Kodiak people. they are large producing areas of pinks and dogs or chums, if you will. It's also probably one of the largest areas of razor clams left in the area in Alaska and from the 1930's until the late 1950's, we used to produce anywhere from 15,000 to 25,000 cases of minced razor clams under the Pioneer brand, off of big Beach, Village Beach, Polly Creek and Kukak, and I think this is a consideration that you gentlemen are going to have to make, too, when you consider all of the resources that we have in the area. The expanded or the proposed enlargement of the Katmai area, I don't know how that would affect our being able to fish along those shores. the planned situation there is such that it's no longer economically feasible to can clams under the regulations as they now exist and until such time as somebody gets reasonable about this thing, why, it's always going to be that way. The fishing is primarily what we're concerned with right at this time, though, and there's potential probably just outside of the proposed Katmai area that the Koniag has selected, that could be developed in terms of mineral, agricultural, aquaculture, hydroelectric power and possible geothermal and even possible hydrocarbons.

Mr. HARVEY. Which side is that on?

Mr. EATON. That's on the southern drainage, yes. And these are areas that we're concerned with, because if the prospect of developing an industry of some kind over there were to present itself and if it became necessary to put it close to the boundary of the Katmai monument, where would we find ourselves in terms of this sea and air law they've got now that you can't pollute? It's getting so you don't dare breathe it any more, because what you exhale, nobody else can use. But I think that we are going to be in a real awkward position if it comes to developing some of that land, in order to keep it, if we're going to have to fight the monument, because if we can't develop the land, there's no way in God's world we're going to be able to keep it, and under the terms of the Settlement Act, we have to generate enough income off of the land that we select to at least pay the taxes and taxes in Alaska on undeveloped land right now are about $25,000 a township. So you figure that when you multiply that by the number of townships that we are selecting over there, it runs into a sizable figure and there is the potential there and all we want is an opportunity to develop it. Thank you.

Mr. HARVEY. OK. Thank you. Yes?

Mr. GUNLOGSON. Dick Gunlogson, Professional Hunter's Association. I think this would be the best place for us to comment on what we have to say on this particular area. This morning when the industry in the area was introduced, I think one major industry in this area was totally left out and that would be the professional hunting or the guiding industry that does take place in the entire unit nine or the Alaska Peninsula area. Perhaps the most significant use of the big game resources in this entire area is the recreational hunting aspect, both in terms of numbers and in terms of dollars.

I will provide for the record here a copy of a map which will show the areas that are utilized by professional map hunters throughout the Alaska Peninsula and the map which is prepared by the State will show that with the exception of the existing Katmai Monument, almost the entire Alaska Peninsula is presently utilized by professional hunters through traditional hunting areas that have been issued to them and are now controlled by the State. That even includes an area for Governor Hammond in the new extension of the national park. Certainly, economic hardships are going to be imposed on the people whose areas, traditional hunting areas, are withdrawn from use. We, of course, well recognize the availability of game. It is an area in which brown bear hunting is the best known trophy animal. Only Kodiak Island could possibly be any better known anywhere in the world of sport hunting, than the Alaska Peninsula for brown bear. Moose and caribou are very important species in that area, too, as well as smaller species such as wolf, wolverine and then the birds, geese, ptarmigan, ducks and so forth. People utilization in that area of the species, there probably are approaching 1,000 residents, permanent residents that live in the area that utilize the game species for subsistence purposes. We estimate 750 to 1,000 resident hunters, perhaps, visit the area annually to hunt. Most of those people utilize the area north of Port Hyden.

Mr. HARVEY. When you say resident hunters, you mean residents of the State of Alaska?

Mr. GUNLOGSON. Alaska residents.

Mr. HARVEY. As opposed to the thousand residents of the area that you were just referring to?

Mr. GUNLOGSON. These are in excess, yes. They are visiting residents.

Mr. HARVEY. I just wanted to make that clear.

Mr. GUNLOGSON. Sport hunters. And we probably have close to the same number of nonresidents including foreign, nonresident sport hunters that are primarily involved in guided hunting in this area, that visit the area each year, representing quite a significant dollar industry in this area, certainly well in excess of $1 million annually is generated by the guiding industry in this one small area, alone. And that is the extent of what we have to say, I think, at this time on this area.

Mr. HARVEY. OK. Thank you. Anybody else have a comment?

Mr. FIELDS. Yes. I just wanted to inquire of the National Park Service as to the usage of the Katmai National Monument. Do you have any figures on what the visitors are?

Mr. HARVEY. Public use of the existing monument?

Mr. FIELDS. Yes.

Mr. BLINN. It varies a little bit from year to year, but generally we've been running about 10,000 people a year in the monument. That breaks down, the bulk of them, probably 80 percent, are in the lake camp area there, at this outlet of Naknek Lake for the rainbow fishing that the State talked about a few minutes ago. Most of the remainder go up to Brooks Camp, where they stay anywhere from 3 days to 5 days or even longer, stay for extended periods. Flying, they're packing, too, marine, they're camping out, backpacking, kayaking, canoeing, this sort of thing.

Mr. FERRILL. Jim Ferrill, Department of Fish and Game. I'd like to address the bear issue and some of the other game species and what-have-you and public use of the area. One thing, there seems to be a tendency to think that because we, as human beings, will draw a line on a map and say that this area is going to be managed for bears, the bears are going to respect that line. And as Will has mentioned, they don't. The bears come and go entirely across the Alaska Peninsula. Essentially, some individuals probably could get their feet wet in saltwater on both sides of it in any given year. We have studies from McNeil River, which is the large blue area up on the top of the map there, where from 1963 on until the present, the State has had life history studies going on the bears there, and up until 1972, along in there, these included marking and tagging of individual bears. And bears from the McNeil River have been identified essentially scattering from that blue sanctuary area in all directions, except into Cook Inlet. There have been bears identified on the shores of Lake Iliamna, Battle Lake, Kulik Lake, Kulik River and to the south, Pinkidulia Cove and areas like this. So those bears will not abide by the boundaries that we have. Along the Naknek/King Salmon road system, there's a population of bears which, unfortunately, are not appreciated by the public quite like bears elsewhere are. These bears tear into fish houses, tip over garbage cans, scare the children and occasionally do physical damage to a human being. As part of my job when I was area biologist in that area, I tagged a number of these bears, marked them, eartags, collars and what-have-you.

These bears were identified passing through the part of Katmai National Monument. There is a special season on the bears out in this area, trying to eliminate the danger to human life and what-have-you. So management by the State is having an impact on management by Katmai National Monument. What I wish to state here and emphasize is that we shouldn't get hung up on the desire that the Park Service or the Park Service and the refuge, alone, have the capability to manage for a population of brown bears. This is going to require management by all people on the Alaska Peninsula. Bears which are being radio collared in the Brooks River in the last couple of years are stepping out into State lands in the spring of the year. Two of them were harvested there last year. I believe we had four radio collars on them. Two of the bears that we'd handled came out and were killed, so this shows that we cannot just sit there and assume any one management agency has got the capability to provide for the continued protection of the bears.

Enough on that. Other uses of the area. Moose are a very important resource, primarily to local residents. The drainages of the Naknek River, including Pink Salmon Creek and Big Creek, Smelt Creek, are particularly important to local residents who live right in that area, to hunt. This is the only area they now have left to hunt, because of the extensions of Katmai National Monument.

Mr. BEVINETTO. Let me interrupt you. To what extent is the taking of grizzly and brown bear in the proposed additions to Katmai for subsistence purposes?

Mr. FERRILL. Essentially, for subsistence purposes, nobody is killing bears to eat.

Mr. BEVINETTO. Nobody is.

Mr. FERRILL. Bears that are being killed are either killed recreationally or in defense of life and property situations.

OK. As I was saying, the residents of both Naknek, South Naknek and Levelock also use the branch of the Alagnak River for their moose hunting and this is a very important moose hunting area to them. There's probably in the neighborhood of some 50 to 100 plus moose a year, come out of the Naknek drainages and the branch Alagnak drainages. Our harvest figures are not totally accurate on that, but it varies from year to year in response to the snow.

The caribou come up and utilize the area just immediately south of the Naknek River as a turning zone on their northern migration. This is the Alaska Peninsula caribou herd. At that time and through much of the winter, they are heavily utilized by local residents in that area, seeking them for meat. In the fall when the early part of the migration hits into that area, there is a fair amount of recreational hunting, both by nonresidents and residents of Alaska, but from other areas. At that time, some local residents are taking animals to eat. In addition, the Mulchatna caribou herd occasionally comes down past Lake Iliamna and enters the northern portion of the boundary extensions there that you see and have entered as many as 3,000-plus animals in that area for a period of up to 30 days. So again, as I pointed out with the bears, the wildlife are not respecting the boundaries that we are drawing. I imagine we will have to take considerations beyond that.

For the recreational harvest and the subsistence harvest, one of the most important means of transportation is the aircraft; small, light aircraft capable of landing on lakes or natural gravel bars, tundra patches, and stuff like this are utilized very heavily by almost all hunters. The only exceptions to this are boat traffic up and down the river and this right here is primarily along the Naknek and what-have-you. It lends itself best to boat traffic, however, once you get away from these areas, you're into an aircraft ball game. There is just a little bit of all terrain vehicle (A.T.V.) and four-wheel use. There are some four-wheel drive roads that extend off of the Naknek and go back up a fair distance, one of which can go into actually what would be part of the park extension.

All trapping within the area is done, a combination of commercial and recreation in that almost all the furs are sold. Very little of the fur taken is utilized directly for family consumption in garments or something like this. The hunters and the trappers vary from village residents who are commercial fishermen during the summer and dependent upon trapping to make some additional funds in the winter, to people who have full-time jobs and what-have-you and that are trapping recreationally, but in all instances that I'm aware of, they're selling the furs. And that, I think, is a thumbnail sketch of the game use in that area both north and south. Oh, I should emphasize the fact that there are established guide camps in all of the areas there for commercial hunting that you might say is also occurring.

Mr. **Bevinetto**. If the two bear species were protected in the additions to the monument, that is, no taking in the additions and in the monument, would that create a natural overflow situation that would increase the migration patterns that you outlined or do you see any effect?

Mr. **Ferrill**. No, if the bears were to be protected in the monument and the extension areas, no hunting allowed and what-have-you, this would essentially reduce the total bear harvest. It would probably have no effect whatsoever on the total capabilities of the bear population. It would not increase the number of bears and it would not cause the bears to spill out in greater numbers than they are right now, spilling out.

Mr. **Harvey**. Yes.

Mr. **Leedy**. Bob Leedy, Fish and Wildlife. Just as a point of clarification, you spoke of two bear species. There's one bear species.

Mr. **Ferrill**. One? Thank you. There are occasional oddball blacks coming in, but they're——

Mr. **Leedy**. In the northern portion, yes.

Mr. **Ferrill**. Right.

Mr. **Harvey**. Yes, sir?

Mr. **Gunlogson**. Dick Gunlogson, Alaska Professional Hunters. I want to also reaffirm what Jim said about the entire proposed addition to the Katmai, it is presently utilized by established outfitters who—many of whom have hunted that area for approaching 20 years, perhaps, and it includes permanent established camps which some consideration is going to have to be given to in preempting their ability to utilize this area. In a manner of speaking, although Jim told you no one hunts bears to eat, perhaps as professional hunters, in a way, we do, because it is a source of our livelihood.

Mr. SILVER. To the National Park Service, I guess, and Fish and Wildlife. In terms of the management and the protection of the bear, is there a need in either the north or the south addition for there not to be taking of the bears to properly manage them, or do you think they could be managed with some type of taking allowed?

Mr. BLINN. Well, within the framework of the existing monument, there's a lot of movement back and forth, as I think has been very well brought out. There is no respect of political boundaries. They probably respect a little more, watershed boundaries, although they do hop back and forth around that, too. But I think you would have better success in protecting a given brown bear population, if you could take in a watershed, such as the country around American Creek there, that to the north of Katmai, or Headwaters Creek, which originates in the park, flows out to the west and comes back into Brooks Lake.

Mr. SILVER. OK. Let me rephrase my question. I'm not sure I made it clear.

Mr. BEVINETTO. What you're suggesting, then, is that the addition would be useful as protecting the habitat.

Mr. SILVER. That's my question.

Mr. HARVEY. All right.

Mr. SILVER. Are you trying to protect habitat or are you trying to protect the species from being taken within the boundaries of the habitat? That's the thrust of my question.

Mr. BLINN. Well, both. If the bear is taken off of American Creek, for example, he won't be in the park, so you've reduced your protection by taking—granted, we're protecting habitat, but in the habitat are bears. That's where your bears are, in the habitat.

Mr. HARVEY. No, but maybe we're not communicating here. I understand the points that you've all made, that it's certainly valid that we can't put up signs and tell the bears to stop here or turn left or right. Well, we could put them up, I guess. Yes, but then we'd have to teach them to read. That's right. But in terms of the addition, this is an issue that we haven't gotten into directly, but it's involved in a lot of these (d)(2) areas. It's a question, a twofold question. One, why are we adding lands to a national park? What are the values there that make us say to ourselves, "This ought to be a park, instead of just another piece of Federal land or a national forest"? And then second, the issue of whether you can shoot animals on land that's park land. To me, it's a twofold question and it sounded as though what you were saying was, you thought the reason to have the addition on the north side of Katmai was to protect the habitat of the bears, but are you also saying that the bears, themselves, are a resource that people would want to come and look at and not shoot?

Mr. BLINN. That's right.

Mr. HARVEY. In addition to other people who want to shoot them.

Mr. BLINN. Granted, you know, we recognize that there are——

Mr. HARVEY. I'd like to talk about shooting them.

Mr. BLINN. OK. There are a number of ways——

Mr. HARVEY. My kids understand that better.

Mr. Blinn [continuing]. You can use or enjoy a bear. Some photograph it, some shoot it, harvest it. Whatever it is. But I think our feeling is that to protect the population, you'd need to consider the entire population within the drainage system and not just draw a boundary across the middle of that drainage and say, we're going to protect these animals, but let these be shot.

Mr. Harvey. I gather the issue is to manage the habitat wisely and at the same time, then, manage the animal wisely in terms of population, and one could argue, then, that it doesn't matter who owns the land or what the legal status of the land is, as long as you have the power to do both things.

Mr. Blinn. Well, if you're going to have a natural population of brown bear, then I think by definition it's an unhunted population, so maybe we have to ask the question, do we want a natural brown bear population here that people can see in that condition? By definition, if you want that, then you don't hunt them.

Mr. Harvey. That's the issue, yes.

Mr. Leedy. Bob Leedy, Fish and Wildlife Service. I'd like to address the area south of the existing monument, which is presently proposed both in H.R. 39, the second print, and by the Secretary as a national wildlife refuge and perhaps a few words about Fish and Wildlife Service refuges are in order. We are primarily an agency concerned with wildlife. Some other uses are permitted on the land when they do not conflict with the wildlife resources. Hunting is generally allowed on the refuges and almost certainly would be allowed on almost all Alaskan refuges—all Alaska refuges. Our primary intent in the area would be to protect habitat. The brown bear in this area is most certainly one of the wilderness species that you were asking about earlier. We would hope, through continued monitoring and research and cooperation with both Parks and A.D.F. & G., to determine better the migratory habits of the bears and the life cycles of the bears, if you would, and to try to contribute to maintenance of bear populations not only on the refuge, but adjoining areas.

Mr. Harvey. Any more comments?

Mr. Cline. Yes, Dave Cline, Alaska Coalition. Just to further emphasize what these gentlemen stated very well in terms of bear resources, I think it's extremely important to take note of the fact that, in our opinion, this particular area and the entire Alaskan Peninsula, for that matter, will take on increasing significance in terms of the national/international significance or interests in the bear resource, as well as other wildlife species. They are particularly, in light of the extensive selections being made on the Kodiak National Wildlife Refuge, which was set aside years ago, primarily to protect its bear. It remains to be seen whether a viable refuge operation can be maintained there through the years. That will depend a great deal on the ability of the State and the Federal Governments to work out agreements acceptable to the new Native landowners. In that light, I think we have to look at the Alaskan Peninsula as a geographic and ecological whole, particularly in light of protecting the wilderness setting for that primary reason, that is, the wilderness environment, the primary reason why we have such large numbers of bears, caribou, and other wildlife. So I would urge whatever management system is considered, and there probably will be a variety, that there will have to be very well coordinated, high levels of cooperation between all the managers across this jurisdiction and the maintenance of the natural setting, that is, the wilderness qualities, if we're going to maintain these grizzly bear populations at the present levels, along with the associated wildlife species, particularly caribou and, of course, eagles and a variety of other species.

Mr. HARVEY. Thank you. Any other comments, let's move on here. Yes, Jules?

Mr. TILESTON. Jules Tileston, BLM. I think maybe we missed a point on the north and it was kind of glossed over. The real reason you've got bears there is because you've got that salmon. In August, there were 250,000 red salmon in that 80-mile stretch of American Creek and that's the reason it ought to be there, primarily because that's a key habitat, is the water and its spawning and that's the cycle that you've got.

Mr. HARVEY. Did you want to say something?

Mr. GORDON. Yes. Two things. First, let me respond to what I think your question is and if this is the policy issue that you didn't wish to get into, let me know. As to the matter of why an unhunted population, the concepts that——

Mr. HARVEY. I'm not trying to address the issue of why an unhunted population. I was trying to get at what the objective was, at least in the minds of the Park Service, for adding that land to the monument.

Mr. GORDON. OK. Well——

Mr. HARVEY. And that objective may well be to have an unhunted population. That, then, is another issue that we're going to take up at another forum, I think, as to whether that's a good idea or not.

Mr. GORDON. OK. Well, that is the objective. But I think the concept which exists is the ecosystem concept. If you don't want that expanded, I won't take any more time with it.

Mr. HARVEY. Yes.

Mr. GORDON. The other thing relates to specific geographic resource areas. You asked before about, again, if I understood correctly, the question of whether bears or other wildlife can be visually enjoyed. In other words, utilized in the visual, nonhunted sense, in the same way as the hunted sense, and portions of this proposal, if I understood you right. there's a particular——

Mr. HARVEY. I wasn't asking a question, I mean.

Mr. GORDON. OK. Well——

Mr. HARVEY. And I think the answer is, yes.

Mr. GORDON. Let me illustrate a particular area that has not been discussed, where I think this particularly applies. The Alagnak River drainage drains out of Kukaklik Lake in the northwestern portion of the Katmai area and it's an area that's in some bills and out of other bills. It is an area in which there is a good fall salmon run, including kings, and it attracts a significant number of bears from a large surrounding region, but the river—as I presume Mr. Hession already brought out—is easily floatable. It's an ideal viewing platform, from which to see these bears and the character of the country is very marshy and it's difficult to observe wildlife. That river corridor is one of the best places from which to observe a significant number of bears in the fall. It is also an excellent opportunity to observe a variety of shore birds, swans, cranes, other migratory water birds. It's one of the best places in the State of Alaska to conveniently observe quite a large significant population of wildlife. So the Alagnak River has particular resource value in that sense.

Mr. HARVEY. Thank you. Yes?

Mr. GUNLOGSON. Dick Gunlogson, professional hunters. With the observing of bears in the huge area on the Alaska Peninsula, at the present time, we have one 2-week season a year in order to hunt bear on the entire Alaska Peninsula. The other 11½ months of the year are reserved for observing and in the area that I've hunted down there for the last 12, 13, 14 years, the prime time for observing bears certainly would not be during the time in which we have our hunting opportunity currently. The prime time for observing bears would be during the time that they are concentrated on the salmon stream, which is in the summer months, starting as soon as the runs of salmon reach the stream and the bears start coming to the streams, and almost any area that has a healthy bear population can be used as an observing area and it really does not have to be closed to hunting.

Mr. HARVEY. All right. Let's—OK. One more and then we're going to go on.

Mr. FIELDS. I just suggest that the Alaska Peninsula is a wilderness area, in itself, by nature of its topography and its remoteness and its climate, and as such, you wouldn't have to designate special areas such as these additions to the Katmai National Monument in order to preserve the wilderness status of the entire peninsula, which is virtually in a natural state, itself.

Renewable Resources

Mr. HARVEY. All right. Let's move on now to pick up the renewable resources, timber, agriculture, grazing. Anyone have any comments on that?

Mr. HANSEN. In the area of agriculture, there is about 6 to 6,000 acres of the 1.2-million-acre proposal area that has some agricultural potential. It's not rated high. It's in the seventh 10 percentile. For forestry, there is no potential that has been rated from a development standpoint or commercial values.

Mr. HARVEY. Rich, did you have something you wanted to say?

Mr. GORDON. I wanted to ask a question on the topography. I was asked to talk recently to the landscape values; is that appropriate or not? I realized you'd gone by this before I got back here. Is it appropriate or not?

Mr. HARVEY. Well, OK, 2 minutes.

Mr. GORDON. I won't need that long. The primary concern in this area that's been identified is that there is a chain of lakes of various sizes that have been referred to. The large lakes, of course, primarily within the park, there are a number of smaller lakes at the edge of low sedimentary mountains, which have a visual character different than any other place north of the Alaska Peninsula in which you have—it looks sort of like a layer cake. It's rather wide, pastel colors, grays and purples and whites and in some cases, black. Very thick lenses of different colors, different shades, and a rather rough-edged sort of appearance that is quite distinctive to that part of the State. In other words, it's not a fine-grain layering, it's a very coarse patterning of rock.

Many of these rocks are cliff formed, they're easily erodible, and a number of the lakes such as Kulik Lake and Nonvianuk Lake to the north have this type of rock bordering their shores. Further to the northwest, north of Kukaklik Lake, this is in the far northern portion of this area, the country is lower and more rolling. The visual appearance is that it's generally flat country, generally tundra, although there are patches of high brush, occasional groups of trees, which stand out as sentinels, and rock bluffs rising directly from portions of the shrine, with other portions being muskeg to the shore or beach. It's a rather distinctive type of landscape.

State and Native Land Selections

Mr. HARVEY. Thank you. Any more on renewable, timber, et cetera? All right. We'll move on now into the non-Federal lands area, the State and Native selections, particularly. Dave, do you want to give us a rundown?

Mr. HANSEN. From the State land standpoint, we currently have about 53,000 acres which is included in the proposal area. We have an interest in gaining 122,000 acres, which is along the north side, including the Battle Lakes area, the northern shoreline of Nonvianuk Lake and also I don't believe we have any in the—it may just touch some of the southern division, but the majority of all this land is in the north. Our main interest in this area has to do with both its—what we feel that is very capable for and suited for a more intensive type of recreation use, which would involve commercial recreation use, as well as hunter use. Also it is very good land from a land capability standpoint, for more intensive use. It's relatively level and it rates both as good and fair in the State for land capabilities, the majority of acres we're seeking.

Mr. QUARLES. What percentage of that northern area, about, the area you seek?

Mr. HANSEN. Just one second. About 11 percent.

Mr. QUARLES. Of the northern area or of the entire?

Mr. HANSEN. Of the entire.

Mr. HARVEY. But in the proposed additions on the north, it appears as though the State selections overlap the additions almost entirely on the north.

Mr. HANSEN. I think I might have misunderstood the question. I believe these are just for the additions, the 11 percent of the additions, not of the existing park, excluding the existing park.

Mr. HARVEY. But the additions you're talking about now are both north and south?

Mr. HANSEN. Both north and south.

Mr. HARVEY. Steve was asking percentage of addition to the north and you don't know?

Mr. HANSEN. OK. I don't know that. I'd have to check.

Mr. HARVEY. On the maps that we have, it appears that it's almost 100-percent overlay. Like 90-percent, anyway.

Mr. HANSEN. I'd have to check into that.

Mr. HARVEY. Yes, we don't have the best map up on the wall for viewing that. That's the solid box of (d)(2).

Mr. HANSEN. Oh, I'm sorry. All right. I'm confused. They've got me with heavy dots and light dots and I get them confused.

Mr. HARVEY. That's their error. Don't hit me.

Mr. HANSEN. Yes. I'm surprised that they overlap the whole addition. I think it's much larger than that. In fact, it's 1.1 million acres and the rest of it is within 122,000. So we're interested in 11 percent of the addition and on the south, the addition isn't that large. We're interested in just two townships on that south there, on Puale Bay.

Mr. HARVEY. How about on the Native lands in that area?

Mr. HANSEN. The Natives have selected about 1 percent of the total addition area, 11,000 acres, and will probably end up retaining all of that acreage.

Mr. EATON. On this, Mr. Chairman, it's my concern, the fact that the proximity of our selections to the extension of the Katmai Monument can pose problems for us in the areas of development, which we may be involved in at a later date.

Mr. HARVEY. Right; I understand. Yes.

Mr. HANSEN. Mr. Chairman, I might just mention that all of the Native selections fell on also very good land for settlement and use, generally.

Mr. EATON. It was planned that way.

Mr. HANSEN. Right.

Mr. HARVEY. Any other comments on that aspect of the thing? Let's move into the energy values, then. Oh, Jack, did you have something? Go ahead.

Mr. HESSION. Yes, just briefly. I'd just like to note that although the State's 11 percent does not sound like much, it happens to be in direct conflict with bear habitat requirements and bear denning habitat on that north side. Understand that, for example, bears will use the sanctuary there on the McNeil River, also move into the Nonvianuk/Kukaklik River and Spectacle Lake country for denning purposes. I believe the National Park Service research has indicated this, and I would turn to the National Park Service for their comments on this.

Mr. HARVEY. Yes?

Mr. TROYER. I'm Will Troyer, National Park Service. Would you repeat the area again, Jack, that you——

Mr. HESSION. In general, the Spectacle Lake, Battle Lake, Nonvianuk, Kukaklik Lake country. That's the 11 percent that the State has identified.

Mr. TROYER. We did the bear survey. That was done, incidentally, by the Alaska Department of Fish and Game and the National Parks Service. We did not go beyond Battle Lake. We found very little denning in Battle Lake, but in the mountains up behind Kulik, and so forth, we found considerable bear denning there, but some of the largest concentrations of bear denning we found was over in the Douglas River area, to the east of the McNeil River drainage. We did not go as far north as Kukaklik Lake and so I can't give you any answers on that, unless Jim Ferrill has done work beyond that that I don't know about.

Energy Resources

Mr. HARVEY. All right. Let's get into the energy area. Does anyone have any comments on that? Yes, sir?

Mr. SISSON. Alex Sisson with the Alaska Oil and Gas Association. Petroleumwise, sedimentarywise, I will be going into two areas briefly. This area in here. The area to the west of Katmai National Monument, and the area which is part of the Bristol Bay Basin and the area from Puale Bay to Becharof Lake. On the east side, on the north side of the Katmai Park Division, the Kamishak River, and the Strike Creek drainage areas, there is a large amount of Upper Jurassic and Cretaceous sediment and sands and clastics which do have a necessary ingredient for a field geologist to understand, to look and make projections offshore and into the area to the south.

The south part of the Katmai Park addition along the upper Kulik River drainage, again, there is Upper Jurassic sediments, capped by tertiary volcanics. On this east side, in the Cape Douglas area, which is part of the park already or the monument already, there is a very valuable resource as far as a geologist is concerned and that is the study of the cretaceous rocks in that particular area. It has had a lot to do as far as the understanding of the potential of the offshore area in the recent Lower Cook Inlet OCS sale. Over the past 2 years, particularly last year and the year before, it has been relatively difficult for a field geologist in private industry to get into and to look at these rocks to make an educated interpretation of the value of the potential hydrocarbons offshore. We hope this does not exist when the final bell is rung, so a field geologist with private industry can get into some of these areas that need to be looked at.

All right. To the south of the Becharof Lake addition on the Alaska Peninsula side and the Puale Bay side, again, this is Upper and Middle Jurassic sediment which has to be looked at. It has some intrusives and it also has some oil and gas seeps and there have been two wells, I believe, drilled in that area. To the west of Becharof Lake, which is part of the Bristol Bay area, this is again a flat country and two wells which I mentioned this morning, were drilled in that area, one to 8 thousand feet and one to 11 thousand feet, and that is the only control point that we have in this known sedimentary basin, so the addition there is part of the Bristol Bay sedimentary basin.

Mr. HARVEY. Hasn't there been other drilling, though, in the——

Mr. SISSON. To the south, yes.

Mr. HARVEY. To the south from there?

Mr. SISSON. Yes. To the south, there has been and I will get into that a little later.

Mr. HARVEY. Yes.

Mr. SILVER. In the north, then, in the areas existing in the monument or offshore, that they use for offshore, what kind of work are you talking about being done?

Mr. SISSON. I'm glad you brought that up. Field geologists with private industry would have been working in this particular area in the Cape Douglas area. There are a lot of, we'll say, sedimentary rocks, and I won't give you the age and so forth, that should be looked at in order to make projections off here into the Lower Cook Inlet.

Mr. QUARLES. Working onshore?

Mr. SISSON. In order to understand what is underneath the water here, you have to make projections of what you do know onshore, and the only way you're going to get there is to get there by permit and permits have been very difficult to get to go into this area to do the work. Now, to answer your question a little bit more, we go in there and we take a few sediments of rocks and with the use of helicopter, and that's the only machine that we have, and we do not do any degradation of the—as far as I am knowledgeable of, of the environment or anything like that. Does that answer your question?

Mr. SILVER. Yes, it does. Thank you.

Mr. MILLER. Tom Miller, with the U.S. Geological Survey. I'd like to make a few comments on the geothermal potentials of the additions that we'll be discussing in the monument, itself. Mount Peulik in the extreme southern part of the southern addition, just south of Becharof Lake, is one of about approximately 25 of the 80 recent Aleutian Arc volcanoes, for which the Geological Survey has calculated a present heat content in the ground of sufficient magnitude to be of interest from the geothermal standpoint. The number that we have obtained is published in the U.S. Geological Survey circular 726, but it's a tentative figure that's relatively meaningless.

I think it might be more meaningful to say that the heat content that we estimate there is approximately 1 percent of the contained heat in the entire Aleutian Arc volcanoes with geothermal potential, and about 2 percent of those that are outside present national parks, monuments, refuges and so on. The area just sout of Gas Rock, which is just barely outside the boundary of the site of the new volcanic eruption as of last April, however, we would give that relatively no geothermal potential becuase of the nature of the eruption and the probable lack of a high level value.

Mr. HARVEY. Anything else on the energy values?

Mr. HANSEN. Yes. From a statewide standpoint, if you look at the proposal area for oil and gas, you find that there is some potential which is rated in the second and third 10 percentiles of the State, but it amounts to about 29,000 acres. Fifty percent of it has been selected by the Native corporations and it is expected that they will keep all of it, and that includes your Puale Bay area. The only other point we might make is that there is quite a bit of concern about this Cape Douglas area, from the standpoint of offshore prospects, which has been brought out here. Onshore, the potential isn't there as far as development actually taking place according to our assessment, and again I guess the only thing we've heard about is the desire of the geologists to look at the outcrops onshore to figure out the offshore.

Mr. HARVEY. Anything else? Yes?

Mr. BISHOP. May I ask a question about Puale Bay? That's in our region, the Bristol Bay region. There's no way we can select any land over there.

Mr. HANSEN. That's what I was thinking it was. What is the area?

Mr. BISHOP. The next bay down is Portage Bay and that would be in Koniag region. I think that's what you're speaking about.

Mr. EATON. Let me put your mind at ease on that. We're not interested in bear there at all. The fact of the matter is, the Natives don't give a darn one way or the other about the bear.

Mr. BISHOP. OK. Well, I just thought I'd ask.

Mr. HARVEY. Anything else?

Mr. BISHOP. Bill Bishop, from the Bristol Bay Native Corporation. In addition to the area Mr. Sisson pointed out to the southwest—or north of Becharof Lake.

Mr. SISSON. Um-hmm.

Mr. BISHOP. That area, I think, has some oil and gas potential. It would be part of this general layout of the Bristol Bay Basin and Nushagak Basin, whatever you want to call it, the same basin.

Mr. SISSON. For the record, we have maps that will be available outlining—I think you might already have them—the sedimentary basins, which include this area.

Mr. HANSEN. As a point of information for the representatives of Bristol Bay, the area we must be talking about there must be on the northwest side, that you have selected in that basin up there, is that correct? A good part of the oil basin on the northwest side?

Mr. BISHOP. Oh, yes.

Mr. HANSEN. OK. And I think that must be overlooked.

Mr. HANSEN. I'm trying to determine off the maps where we selected and where you selected also. That was Puale Bay. So I stand corrected, it would be on the northwest side. Thank you.

Nonfuel Mineral Resources

Mr. HARVEY. Any other comments? All right. How about the nonfuel minerals?

Mr. BLINN. Could we get into a discussion on minerals or could I call on somebody to discuss that?

Mr. HARVEY. That's what I was just saying, yes. Nonfuel minerals, yes.

Mr. BLINN. All right. Gil Blinn with the National Park Service, and I'd like to call on David Jones. I had to bring in help from outside.

Mr. JONES. My name is David Jones and I'm the Chief of the Mining and Minerals Division of the National Park Service. In connection with the (d)(2) lands in Alaska, we've followed the same procedure that we followed in all new park areas, and that is to show the preliminary cost estimate of the acquisition of the interest. In this case, we went out on contract to have various people respond to a request for a proposal to prepare a gross mineral estimate, a gross value of the mineral estimate and we had gone to the Kardex System in Alaska and plotted all known mineral interests on the various quadrangle sheets and this was submitted along with the request for proposals. The market value of the mineral interests was based upon the definition of the highest price, in terms of money, that the property would bring if exposed on the open market for a reasonable time to find a purchaser who purchases with full knowledge of all of its uses and to which it is capable of being used. In this case, the contract was issued to Russ Chadwick and he's here in the audience and he can answer any other questions you might want from him. I should say that this only goes to the Morton Proposal.

Mr. HARVEY. Did you have something?

Mr. CHADWICK. I'm Russell Chadwick, consulting geologist, and at the time of the work, we were speaking about the Katmai itself and some small additions to the north and the east, and within that area on the Kardex System and according to the records, so far as we know, there were only three properties involved. One of them was over in the Douglas River area and although it was stated on the Kardex System to be a mining claim, they basically were not mining claims. That's flaying young sediments there and there's simply no metallic minerals. These were obviously in error on the Kardex System. The other two properties, one was a prospect, some ground held by Bear Creek Mining, up to the east of Kulik Lake and it had been staked on a geochemical anomaly and had already been tested geologically by reconnaissance and dropped by Kennicott, and the third property was some old placer claims. No; I think it was a claim in the area just south of Kulik on a little tributary of the Kulik and it obviously had not been worked on and was a very bouldery creek and it's doubtful in the light of geology if there would be anything there if anybody had worked on it. But it also hadn't been any recent filing of boost of labor. So that was the sum and substance of the existing, presumably subsisting, mining claims in that limited area of the park, itself, and the then proposed Morton addition.

Mr. HARVEY. OK. Thank you, Russ. Yes?

Mr. HESSION. I wonder if I could ask Mr. Chadwick what the situation is with regard to the south addition?

Mr. CHADWICK. Well, I don't know. My particular chore under contract was simply to look up these existing subsisting claims that were of record.

Mr. HESSION. Thank you.

Mr. HANSEN. On a statewide basis, there are about 780,000 acres of the 1.2 million acre addition areas that have some mineral potential; however, all of this falls below the top three 10 percentile, so it isn't rated real high, keeping in mind that the assessment for minerals in the State mineral potential include about 187 million acres.

Mr. HARVEY. Thank you. Yes?

Mr. SINGER. Don Singer, U.S. Geological Survey. We have two favorable areas that run through this whole region, including the existing park. One of them is the one I mentioned earlier with respect to Iliamma, and that is the region of area 7 and I simply won't repeat all of that, but it includes the potential for porphyry copper deposits and porphyry molybdenum deposits and also copper skarn deposits. The other area runs all the way to the eastern half of this whole region, all the way down the peninsula, and though the numbers that I will present for those apply all the way down, they do not apply specifically to this area alone. This particular area has potential for what we call island arc porphyry copper deposits. There have been recent discoveries all the way down the peninsula, of this particular type of deposits. Few of these have been adequately explored individually, have not been drilled sufficiently, and it is our estimation that there is a 90-percent chance that there are at least 30 deposits of this type or there are 30 or more deposit of this type within this whole belt, and there is a 50-

percent chance that there are 50 or more deposits of this type, and a 10-percent chance of 74 to 75 or more deposits of this type running down the belt of the island arc porphyry copper type.

In addition, there is some potential for porphyry molybdenum deposits. We estimate there is a 90-percent chance of at least one deposit of this type, a 50-percent chance of three or more deposits and a 10-percent chance of six or more deposits of this type. Again, this applies to the whole belt all the way down. If it would be acceptable, it probably would not be to your advantage for me to repeat this later on in the later discussions, so I'll handle that area also.

Mr. HARVEY. Fine.

Mr. HANSEN. May I ask Mr. Singer a question?

Mr. HARVEY. Go ahead.

Mr. HANSEN. When you say the entire peninsula, do you mean down to Cold Bay or——

Mr. SINGER. Essentially, yes. That isn't our map, but that's essentially the area.

Mr. HANSEN. OK. You're talking about the entire area that's indicated there?

Mr. SINGER. Yes.

Mr. HANSEN. So that's all the way up to Iliamna?

Mr. SINGER. Yes.

Mr. HANSEN. On the northern side.

Mr. SINGER. That's right.

Mr. HANSEN. A bit north of Iliamna.

Mr. SINGER. Our area runs parallel with the bottom part of Iliamna Lake.

Mr. HANSEN. OK. Thank you.

Mr. HARVEY. Do the miners have any comments?

Mr. FIELDS. Yes. Mr. Chairman, I'll discuss the relationship with the Alaska Peninsula.

Mr. HARVEY. Any other comments?

Mr. BANNISTER. D'Arcy Bannister, Bureau of Mines. Maybe it's well understood, but could I ask Russ Chadwick if he could perhaps distinguish between a study of the mineral resources potential of the area and how that is different from his specific study; would you comment on that?

Mr. CHADWICK. In addition to having been in there for the Park Service in 1975, I've been through the area on helicopter reconnaissance and I would incline in general to agree. Like any such large area that's been so little worked on, it's certainly got potential. However, at the moment much of it is not under claim and there's no valid legal basis for it, but nobody can mark off the country down there. Certainly because there hasn't been that much work on the obvious geological background of it.

Mr. HARVEY. I think the miners have decided to say something. Bill?

Mr. FANKHAUSER. I'm Bob Fankhauser, Alaska Miner's Association. I would like to point out one thing. The Apollo Gold Mine, which is located further on down the chain, around Unga Island, serves as a model for volcanogenic type gold deposits on the chain, itself, and the area around Battle Lake, does have potential for this sort of gold deposit, localized in mainly andesitic volcanic, so I just thought I'd mention that as a potential resource value.

Mr. HARVEY. OK. Thank you.

Mr. BANNISTER. D'Arcy Bannister, Bureau of Mines. We'll have three types of data which we can give you as soon as we assemble it. First is a report by a contractor, a private consultant. We asked him to summarize and synthesize the data on the Alaska Peninsula. That is being edited now. It points out the high potential in this red zone for typical copper molyporphyry systems. By the way copies of this type of map for the entire State have been provided for you, on 1 to 1 million scale. The second thing that we're compiling is proprietary data on this same general Katmai area. This map which I'll leave with you summarizes what we've compiled so far. I would note that the map is incomplete.

Mr. HARVEY. Is this something you're doing for the entire area of the State of Alaska?

Mr. BANNISTER. We're doing this for most of the (d)(2) areas.

Mr. HARVEY. How about the rest of the area of the State of Alaska or the rest of the United States?

Mr. BANNISTER. Did I say the United States?

Mr. HARVEY. No, no. I'm just asking. Is the same kind of information being compiled by the Bureau of Mines for areas other than (d)(2) areas?

Mr. BANNISTER. This is a compilation of proprietary data on Katmai and Alaska Peninsula areas that was generated before classification as (d)(2) lands. I will leave this map with you now. In addition, we anticipate field checking and providing more complete information in a report on the same areas.

Mr. HARVEY. Thank you.

Transportation and Access

Mr. HARVEY. OK. Let's go on and finish this area with the transportation, access issues. Does anyone have any comments that haven't already been covered? Yes, sir?

Mr. BISHOP. I wasn't here yesterday, but [indecipherable, inaudible] I believe they call it [indecipherable, inaudible] of Alaska. We didn't like it in our region and we were told by the Interior Department that if we didn't propose our own, which we did in two different areas and sent in maps, and this would be primarily for a corridor to—if they find some oil or gas in what they now call—label petroleum reserves in Alaska. It is an ice-free port and it looks like it's going through our region one way or the other, so we proposed our own route, and that would come down west of Iliamna Lake and through this addition to the Becharof addition, both on the north side and the south, and come out at Puale Bay, and that was sent in, I believe, back in August of 1975. We could have an alternate, perhaps, to go in the south side of the lake, but from the recent volcanic activity this last April, it kind of precludes that, so if you're going to have a pipeline route or a transportation route across that part of the Peninsula, it will have to go north of the Becharof Lake.

Mr. HARVEY. Thank you. Anything else? Any comments? All right. Well, we'll move on to the remainder of the Peninsula.

Mr. **Bishop**. Excuse me.

Mr. **Harvey**. Go ahead.

Mr. **Bishop**. I think perhaps I missed something else that I should have had under energy, but Kukaktlik Lake, that's the north part there below Iliamna Lake, the big lake I was pointing to.

Mr. **Harvey**. Um-hmm. Yes.

Mr. **Bishop**. There have been some studies done on that as a potential hydroelectric site. The lake is fairly high and the Alagnak River that we've been talking about drains that lake, but anyway, and also one of our village selections is in that area, in case you needed to know.

Mr. **Harvey**. We're going to take up, now, the rest of the areas on the Alaska Peninsula that we have not discussed. I think we should note for the record also that since the (d)(2) issues started, that in the last few months, there has become some general agreement, at least between the Carter administration and the House Representatives of the Subcommittee of the Interior Committee, that if the House of Representatives agrees with that judgment should be in effect made a study area and some of the previous proposals would not be implemented at this time. My judgment is that if the House of Representatives agrees with that judgement and the House passes a bill in that form, I would suspect that it would be extremely likely that the Senate would go along with that approach and that that's the way the bill would come out. Who would like to kick off talking about the scenic, landscape, and other values? Yes?

ALASKA PENINSULA

Scenic, Landscape, Historic, and Archeological Values

Mr. **Dapkus**. I'd like to talk about the Aniakchak River and mention a few of the values of that, which the rest of these gentlemen will probably talk about in much more detail.

My name is Dave Dapkus, Heritage Conservation and Recreation Service. The first value of the river that I'd like to talk about is its geology and turn it around from thinking of a mineralized area in terms of money, that way, but more as a scenic area. It's the only river we've proposed up here that starts in a volcano in Surprise Lake, flows for about a quarter of a mile out of the lake and while it's still in the Caldera area, it then goes to what is called the Gates which is a 2,000-foot high volcanic rock, and on down to the Pacific Ocean. The geology of the Caldera, both inside and out, and the Gates add a great beauty to the river, which makes one of its big values.

Another value is the—I'd like to term it scientific. The volcano erupted in 1931 and there is some record prior to its eruption of its plant and animal life, but the eruption wiped everything out and now the plant and animal life has come back very strongly, so there's lots of room there for some scientific studies. Also under scientific, down at the mouth of the Aniakchak, it dumps into Aniakchak Bay and there's nine known beach lines there now, which are also interesting from that standpoint.

A third value is the recreation and that's really twofold. One is the floating opportunities by raft. It's one of the rougher streams I've ever been on, although the Aniakchak is short, some 27 miles long. The upper half of it drops a hundred foot per mile, including class four water on a national scale, which is pretty rough stuff. It's lots of fun, although small. The lower half of it is class one water, which is the easiest type. Another form of recreation that the Aniakchak offers is excellent hiking, both in the Caldera and outside. It's all alpine tundra country and when you're doing this hiking around, you get a chance to not only enjoy the scenic beauty of the geology of this country, but also watch the animals, most notably, the bear.

The access is good, weather permitting. You've got Surprise Lake, which is rather large, inside the Caldera and you get to fly through the Gates to get into it and Aniakchak Bay, down at the end of the river, so it's good access by float plane. Thank you.

Mr. HARVEY. Thank you. Anyone else want to comment on the scenic? Yes, sir?

Mr. GORDON. Two parts. First of all, islands, second, the peninsula. Or is that supposed to be part of the island as well?

Mr. HARVEY. Which islands are you speaking of?

Mr. GORDON. The Aleutian Islands are listed on here.

Mr. HARVEY. Yes.

Mr. GORDON. OK. I'll simply talk about islands and use these as examples for the whole State, so I don't have to talk about it again. There are basically three types of coastline island scenery. Obviously, there are volcanoes and there are all sorts of characteristics which I don't believe have been mentioned, but just taking the three major types of rocks, the igneous and intrusive rocks, sedimentary rocks and volcanic rocks, they have very different visual characters and you can see them on the coastal islands. All three are represented on islands off the coast of the Alaska Peninsula. The sedimentary type, of which the best example I know of is Cape Thompson and Cape Lisburne on the Arctic Coast, but there are similar islands elsewhere on the peninsula, are simply matted layered rocks, which contain bands of different colored rocks. They will cut very often uneven edges, which makes them very ideal for sea bird nesting. This is the layered, banded appearance.

The second type of rock, which is far more common, is the lava rock and the—in many cases, too, you have layers of lava rock with differential erosion, forming ledges and cliffs. It tends—the lava rock tends to be very dark, almost black sometimes, contrasting with the lighter color of the ocean. Again, generally a very good habitat for sea birds, because you have layers in this type of rock, so that's part of the visual experience to the birds. And interestingly enough, in my observation, at least, this lava rock seems to be more fertile and you have much more luxurious mosses, liches, and so forth, so they have a much greener appearance. Some of them look almost tropical, a contrast between the rocks and the vegetation.

The third type, which is characterized by the Semidi Islands, are intrusive rocks, granite type rocks.

There you simply, very frequently have pinnacles and vertical columns of smooth-faced pale to dark gray rocks. In that kind of rock, you frequently get erosion by the sea, apparently in dikes in the rocks, that cut long, sometimes straight, sometimes winding, canyons, actual clefts in the rock, and in the Semidi particularly, you can take a boat, go up to 300 yards back into some of these cliffs that may not be more than 30 or 40 feet wide, 500 vertical rise on both sides. Very striking type of landscape.

Two areas on the main part of the peninsula, which are illustrative: One, Castle Cape area. That's on the southern part of the central peninsula just south of Chignik Bay. It is a fjord coast, deeply indented by the sea, and it illustrates the layered, sedimentary type of rock I was talking about. In this case, the strikingly different degrees of lightness and darkness among the different layers that you can see 10 miles offshore, as well as erosion in the Castle Crags, Castle Cape, which is at the outer edge of this peninsula and is a famous landmark to ship travelers. The fjords, themselves, are typical of fjords elsewhere. It's a mountain coast, with deep sinuous inlets, much longer than they are wide. A classic example of fjord coast and layered rocks in the State of Alaska.

The final type of landscape is probably the most characteristic one on the peninsula, is the impressive large volcanoes. The example we've chosen for this study is Mount Pavlof in this vicinity, which is near the southern end of the peninsula. Pavlof is one of the classic Fujiyama type volcanoes.

It's steaming about 8,000, some odd hundred feet high. It has a subsidiary cone, which has a certain double shaped pattern to it. There is a valley leading north, with volcanic flat-topped, vertical sided buttresses sticking down into the sides of the valley. It's called Cathedral Valley. There is, to the southwest, in this particular case, an outstanding viewing platform, the rim apparently, I would guess, of an old cauldera. I won't confirm that, but at any rate, again, a rim with a lake, a long narrow lake below the rim, at a fairly high elevation and there are other deep chasms in the high mountains rising behind. From Izembek Lagoon, which is not the subject of this discussion directly, but it's a classic example of a lagoon. You get an excellent view across the flat forelands, which are characteristic of the north sides of the Alaska Peninsula, up to the volcanic group of which Pavlof is a part. In the Alaska Peninsula visual experience from the north side, from the northwest side, encompasses the extensive lagoons, beach frequently, tundra country, with the high volcanoes and the canyons leading up to them rising in the distance. Thank you.

Mr. HARVEY. Thank you. Anyone else want to comment on the scenic? Go ahead.

Mr. FIELDS. OK. Maybe in contrast to that, the view of the scenery down there that we've heard, I would put forth another viewpoint, in that the scenery down there is not amenable to viewing, primarily because of the weather conditions and the climate down there. At best, the weather is atrocious, and at worst, it's devastating.

Mr. Gordon. I'd like to comment that I've seen everything I've described. I don't think I've ever seen, say, 40 knot winds in the fog down there. The wind blows from one side of Bristol Bay over to the Pacific side and then back again with irregularity and as such, it is extremely difficult to enjoy the area down there for any length of time.

Mr. Bishop. Well, Mr. Chairman. I'd like to corroborate that and I might add, too, that hiking is good, because there are beautiful bear trails that any damn fool can follow.

Mr. Fields. I don't know. No, that's right.

Mr. Harvey. Well, we'll pick it up from there, yes.

Mr. Tileston. Jules Tileston, BLM. In this area, we're dealing mostly with a very significant land form, and that is volcanoes, themselves. We've just talked about Katmai, we're now talking about Aniakchak and that's been fully described. There are two other areas and, of course, in the lake park, you've got a different type also. But in this area and out on the chain, there are two other volcanoes which are distinctive and certainly worthy of some type of special treatment. One is coastal, which is on Unimak Island. It is in an area where there is, in fact, public land left. I can give you a full description of it, if you'd like, but basically it's a textbook example of a volcanic caldera, entirely different from what you have previously heard. Its outer flanks are selected. The use for agriculture, it's gently sloping and has a complete flora range.

In a relatively short time, you can drive to the top by existing jeep roads. Once you get there, you look down almost a thousand feet straight into the caldera. You cannot get there for much of the year because of the weather. It is very, very severe, however, there is public land there. It should be considered. It was not considered, simply because it was classified as Native selections. We now know where the selections are going to be and the caldera, itself, is available and should be considered.

The second issue, which again with the ground rules, is that you don't look within existing refuges, parks, forests, et cetera, and that's on Bogoslof Island?

Bogoslof Island is the classic national textbook example used in all of the geomorphology textbooks of this type of volcano and gain, even though it is in protective status as a wildlife refuge and you've heard something about it, its land form is distinctive and is world reknowned.

Mr. Harvey. Thank you. Anybody else have comments on that?

Mr. Blinn. Gil Blinn with the National Park Service. I would have to agree that the weather in the Aniakchak area is something to behold, but we do have a good area down there in Aniakchak for research in volcanism. Since this last erupted in 1931, it's a dry caldera, rather unique in the world, and with a separate vent mountain, in fact, within the caldera, it's about 6 miles across the entire caldera, with a lake inside, and it does provide unique opportunities for volcanic research and I think that this is probably the greatest attribute in considering this as a possible national monument. Of course, its very important secondary attribute is the Aniakchak River, which Dave Dapkus has so well described. These are the two things that are attractive.

Mr. **Harvey**. Anybody else have any comments? Yes?

Mr. **Gordon**. Just in addition to what Jules said, I'm glad he brought up Aukmak. I think we'd forgotten it. When I last saw it, it was steaming very much the way that the Valley of 10,000 Smokes apparently steamed in the early part of the century, which adds, of course, great research opportunity and also is visually very impressive.

Mr. **Miller**. Tom Miller of the USGS. I've done quite a bit of work in the last 5 years inside Aniakchak and I've also worked inside Aukmak. Actually they have both very similar features and the sloping crater inside is not related to anything that would have been similar to the 10,000 Smokes. It's an intracaldera cone. The point is, in terms of what Gil Blinn mentioned as a very good point, it is a very valuable area from a scientific standpoint. The caldera, itself, although the last intracaldera eruption was in 1931 and we believe the caldera was formed about 3,500 years ago, we can pick out something over 20 postcaldera eruptions that are readily visible or mappable inside the caldera and there's probably three times that many that have left relatively little trace. I'm speaking specifically just of the caldera, itself, for these volcanic features. Outside the caldera in the immediate area, there are the ash fall deposits, which will tend to be well vegetated in general and a much better example can be seen in the Valley of 10,000 Smokes. Thank you.

Mr. **Harvey**. Any more comments on the scenic issues?

Mr. **Leedy**. Bob Leedy, Fish and Wildlife Service. I'd like to make a few comments on archeology in the area. The relatively constant climate and a rich maritime environment, conditions have been favorable for human occupation in certain areas for at least 12,000 years. In fact, the Shumagin Islands and Fox Islands of the Alaska Peninsula were a part of the Bering Land Bridge, which is the hypothetical link that allowed the occupation of the New World, and these areas may contain information about exactly how, where and when this event occurred. We have some prepared statements here that have been given to you and the reporter and should be entered in the record.

Wildlife and Fish Resources and Uses

Mr. **Harvey**. Good. Thank you very much. Anything else on the scenic values? All right. Let's go on to the wildlife values that are out there, including various uses or sport, subsistence, commercial and so on. Fish and Wildlife Service, do you want to kick that off?

Mr. **Leedy**. Bob Leedy, Fish and Wildlife again. I'd like to speak just to the waterfowl and perhaps pick some more up later. Several areas on the peninsula provide habitat for millions of migratory waterfowl. As an indicator of the importance of these areas, the Alaska State Legislature designated five of the Alaskan's eight most outstanding estuaries as critical habitat areas, a designation given to very few areas. The rich peninsula estuaries, primarily on the Bering Sea coast on Bristol Bay, are basically habitats of ducks, geese, swans, shore birds, Sandhill cranes and other birds which fly through the Pacific flyway, the mid-Pacific route or the Asiatic route for migration. These estuaries are utilized by waterfowl primarily as staging grounds for stopping both enroute north to the breeding grounds and south to wintering areas, primarily in Mexico, California, Oregon, Washington. Of special note, over 90 percent of the world's black brant, a species in decline since 1967, use the estuaries of Izembek National Wildlife Refuge during migration. Most of the world's emperor geese, over 100,000 of the lesser Canada or cackling geese, 200,000 snow geese, white crown geese, sandhill cranes, 10,000 whistling swans and over a million ducks all rely heavily upon the peninsula's staging areas, both in the estuaries and adjacent berry fields. And the value of this waterfowl habitat cannot be overestimated.

Mr. Harvey. Thank you. Any other comments on the wildlife? Yes, sir?

Mr. Ferrill. Jim Ferrill, Alaska Department of Fish and Game. I'm sure the Fish and Wildlife Service will go into it also, but first I'd like to address the overall Alaska Peninsula, essentially from Katmai National Monument south, and then I'd like to make some specific references to the Aniakchak Caldera Proposal.

Essentially, the big game species of most importance on your Alaska Peninsula again are moose, caribou, and brown bear. The moose occupy the area from Katmai all the way south as far as Port Moller. There's a few straggler animals that are on the other side of Port Moller, which may establish a viable population in the near future, but this remains to be seen and has to be watched. Throughout the remainder of the Alaska Peninsula, that herd is declining. It declined from a failure to recruit calves into the population. It is not a factor of hunting, sport hunting, subsistence hunting or anything else like this, although the decline has been extended by hunting of all types.

The Alaska Peninsula now has very restrictive regulations on it, as a reflection of the State's part on the fact that the population is declining. Most of the moose that are taken are now taken by recreational hunters. The villages from Katmai south tend to prefer caribou as a subsistence animal, although Chignik, Ivanof, Perryville are hungry enough that they'll take any meat animals they can get, including brown bear.

The caribou population from Katmai National Monument south is called the Alaska Peninsula. The caribou population is consistent on three segments. One segment on Unimak Island, another segment from False Pass to Port Moller and a third segment from Port Moller up to the Naknek River. It is this third segment which receives most of the hunting pressure. Again, it is the one that provides most of the subsistence for the villages along the Bering Sea side. The only village to potentially utilize the caribou south of Port Moller is Nelson Lagoon, although Cold Bay residents and what-have-you also hunt and utilize this same area, they are not in the normal subsistence category type of hunters. The remainder of the hunting on the Alaska Peninsula, like I said, is recreational. The early fall hunting frequently is trophy hunting with hunters coming from all portions of the world, but in addition, there are a large number of Alaskan residents who come out and hunt the Alaska Peninsula on hunting. These are primarily people from Anchorage, Fairbanks, Southeastern Alaska, and other places.

As mentioned earlier, the big hauling species is the brown bear. The brown bear of the Alaska Peninsula are probably comparable only to Kodiak and may be superior to Kodiak. It has the capability to grow the largest bear in the world. The brown bear is managed for many things on there, but right now it's managed and recognized primarily as a recreational or a trophy species. The subsistence use of the species as a meat animal is very minor.

Essentially, we have decided that the species is utilized by people seeking things other than meat. For that reason, we have got very restrictive seasons. Alternate year hunting, essentially, and no year has both the spring and fall seasons. We are restricting the harvest to a limited number of animals in an effort to maintain the fact that the Alaska Peninsula produces a very large bear.

For all three of these species, I think it is once again important that I stress that the wildlife will not respect the lines we draw on paper. The tentative ownership right now is lined out on the Alaska Peninsula, no one entity can say it can do the job of managing the resource. In fact, any one of the three major landowners, the Federal Government, the State government or the private ownership, has the capability to seriously dampen or perhaps even negate management by the other two agencies. The caribou migration comes through all areas of the Alaska Peninsula. Originally, it was concentrated primarily on the Bering Sea Flats. Now, that caribou migration travels a great deal through the Aleutian Range Mountains, itself, and a significant number of animals are on the Pacific side bay. A pipeline, a road, caribou could be blocked by reindeer grazing operation, many things could stop and negate the caribou management from the philosophy of either the State or Federal Government or private individuals if they were to try to get into it.

Moose winter on the Bering Sea Flats and on the beaches of the Pacific side. In doing so, they cross three land ownership patterns in many places, all three. A fence, a road, farming, cattle, anything like that could theoretically block the migration of moose and have an impact far beyond that which is just in that limited geographical area. Brown bears, as we discussed, also migrate across the entire length of the Alaska Peninsula. In the Chignik Lake area, the Department has had an extensive bear-tagging program going on for the past 5 years, with collaring of animals and recovery work, using helicopters, dart guns, all those kinds of things we enjoy watching on television so much. And they have shown that, once again, that although individual bears have something that might be classified as territories or a home range, when we talk about the species and what-have-you, they require a large area and do take from saltwater to saltwater.

Access along the entire Alaska Peninsula is almost entirely restricted to light aircraft. This includes subsistence as well as recreational trophy hunting. It is the one viable means of access. Boats are of limited use along some of the rivers, lakes and along the Pacific side, commerical fishing boats offer some access, but it takes a pretty big boat to be safe on the Pacific side. That is some of the meanest water going. Your chances of survival there are about the same as the weather, itself. It's nasty, it's mean. A.T.V.'s are in extensive use in some areas. They have been primarily brought in by guides as a means to allow their clients to travel to the more inaccessible areas, in an effort to produce large animals.

There is only a very, very limited road system and this is associated almost entirely with the few towns that are around the area.

The Alaska Peninsula also has a very large marine mammal population. In addition to some areas where sea lions haul out and what-have-you, the two species of major consideration should be the harbor seal and the sea otters. If the State is returned management under the Marine Mammals Act, there will be an opportunity for people to being to harvest these two species commercially. The harbor seals, prior to the Marine Mammals Act, were harvested in almost every bay along the Bering Sea side of the Alaska Peninsula, and this provided a substantial form of income to residents of some of these villages who do not have other sources of income. The sea otters on the Pacific side of the peninsula in particular are reaching high densities in many areas, and it would be conceivable that again harvesting could be allowed in these spots. Again, I'd like to stress that if harvesting were allowed, this is the type of activity that would benefit local residents, in that it would not require an extensive outlay of cash for the individuals to get into it, such as other land use or developmental projects might consider.

Trapping within the area is almost entirely commerical. Very little of the fur is used for domestic use. Most of it is sold to commerical fur buyers. Within the Aniakchak Caldera, this area right here is very important to recreational hunting and to a lesser degree, to some of the subsistence activities of Chignik, Port Hyden, Pilot Point. The boundaries, as they're drawn right now, take in portions of the Meshik River and the upper Cinder River areas, which are very important recreational hunting areas.

These areas right here are particularly important, primarily to guides, but also to the Alaskan resident hunters from other areas. The Cinder River area has a natural series of cinder blows, which are suitable for landings of light aircraft. This makes good access to people who wish to come on in, camp, and then go hunting. The Meshik River area has a lake at its head, in Meshik Lake, and it can be floated, although there has not been a lot of it done because it is a shallow stream and it's somewhat a situation of walking much of it rather than floating. It has been used by hunters in the past as a means of getting access into the Meshik River and its population. Both areas are utilized by trappers from Meshik Village and Port Hyden and Pilot Point. They come into that area in the winter, generally are placed into the area by light aircraft, and then trap.

This is the main gist of what I have to say at this time on game and game uses.

Mr. HARVEY. Thank you.

Mr. QUARLES. This summer, I think it was mentioned at the beginning or as recent as yesterday, that this summer, several staff members of the committee held some workshops in Alaska Native villages and one of the villages that we held the workshops in was Port Hyden and I think we were struck here by the testimony of the people at the workshops about the competition from sport hunters and trophy hunters, and what they regard as a rather dramatic decline in moose populations and some of the other species. In fact, we did receive testimony, if my memory serves me right, that some of them had even turned to bear for possible subsistence needs. They also made it very distinct that they regarded the portions of the Crater proposal as subsistence areas which they wish to use. I wonder if you could just be a little more detailed on how the State is handling that competition in that area between sport hunters and trophy hunters and subsistence hunters and, in general, what management techniques you're using?

Mr. FERRILL. OK. I could go on forever now, but I won't. At this point right here, the State is trying to provide preferential seasons for local residents. With the emphasis on brown bear, as I mentioned, alternate year seasons. The species are hunted primarily by recreational hunters and what-have-you and they're getting a very small share of time now. They don't even get to hunt once a year, and it's only every other year. The moose and caribou seasons, we tried to maintain hunting the same day airborne, on caribou, because this was the primary means of taking caribou from January through March. This was held primarily to allow local residents to continue to go out and get those animals in the manner they always have. This last year, the board again deleted that exception. The season runs into March 31. The bag limit was increased one animal this last year. Again, the late harvest is primarily by local residents. This year, for the first time, we have a harvest ticket program, which is going to be affected primarily in documenting the sport harvest on the caribou and that shows the tentative runs at this time of about 250 to 260 caribou were taken during the fall sport hunting period. This is a rather low number of animals for a herd which may number in excess of 15,000 animals.

On moose, the season there has been greatly reduced. We've gone to a 50-inch minimum antler size regulation throughout much of the area and that has effectively discouraged a great deal of the harvest pressure. We have tried to maintain antlerless seasons, late antlerless seasons, and the villages would have the capability to keep the meat and what-have-you, but we have had trouble complying with a bill passed by the legislature, requiring agreement of all the advisory committees within the game management unit before an antlerless season could be held. Last year, unfortunately, several of the advisory committees did not meet and the season was lost. This year, we are trying to again provide for an antlerless moose season, so the local residents can take these animals for meat. The results of those antlerless moose seasons in past years have been a very low level of harvest and almost entirely by people who live on the Alaska Peninsula, itself.

Mr. HARVEY. Does anyone else have any comments on the wildlife?

Mr. BEVINETTO. Would you explain the objectives of the trophy hunting program and how they go to the remission of game management?

Mr. FERRILL. Are you referring to moose or bear? Oh, both?

Mr. BEVINETTO. Both.

Mr. FERRILL. With bear, the objective of the trophy hunting program there is to maintain a reduced level of harvest, which will insure that some of the large male bears continue to exist in the population. In short, although we know biologically we could have a young age class in there with good reproduction and maintain that population with no shortage of numbers, we are trying to maintain an age population that has older individuals in it. In short, we are not managing maximum sustained yield. We are managing at a harvest level less than that. For moose, the objective there is by limiting harvesting to animals over 50 inches, is to allow the younger age class bulls, which were formerly taken in great numbers by recreational hunters, to reach maturity and we have reduced the total harvest. The cow/moose, as I mentioned, has been tentatively designated as an animal which will be harvested as much as we can by the local residents. We are trying to set seasons and bag limits that will give the local residents preferential use, while at the same time staying within the constitutional limitations of the Alaska State constitution.

Mr. HARVEY. Anyone else have any wildlife comments?

Mr. BLINN. Gil Blinn, National Park Service. In recognition of the hunting values in the Aniakchak area, and Jim can elaborate if he cares to, an agreement was signed between the State and the Secretary of the Interior which would provide for continued recreational hunting in a portion of the Aniakchak proposal and for subsistence hunting throughout the proposal, so that these activities can still continue.

Mr. HARVEY. OK. Yes, Dave?

Mr. HANSEN. Well, just a comment, that in the Udall proposal boundaries for the Alaska Peninsula Wildlife Range, we find that it rates extremely high for overall wildlife habitat and, in fact, the area is about 4.3 million acres in size and nearly 1 million acres falls in the top 10 percent of the State's wildlife habitat land. Of the top 20 percent of those lands, I should just mention that you have well over 1 million acres and almost 95 percent of it, almost 95 percent of all the lands are rated in the top half of the State. The Natives own well over 50 percent of the best wildlife habitat land. In the one area which is not included in the Udall proposal, is the Aniakchak Monument, and I think it's significant that all of the lands in the Aniakchak Monument fall in the top or second 10 percentile of the State's wildlife habitat area. So this is significantly rated extremely high for overall wildlife habitat.

Mr. HARVEY. Yes, sir?

Mr. GUNLOGSON. Dick Gunlogson, Alaska Professional Hunters. The comments I made earlier in the northern section of the Alaska Peninsula are applicable to the entire peninsula, so I won't repeat them there. I just want to once again state that the entire area is heavily dependent or used by the guiding industry and we are dependent on having the opportunity to continue our operations in that area to maintain the wildlife.

Mr. HARVEY. OK. Thank you. Anybody else? Yes, sir?

Mr. LEEDY. I'd just like to reinforce some points that are very obvious. All of the land south of Lake Becharof there is such a complex selection pattern that it will preclude any large, contiguous areas of landownership and I think it's obvious from various discussions and interests that different landowners will have different landownership orientations, and regardless of the best intent to manage lands cooperatively, the efforts will have to be made during the study period to block out land for the benefit of all owners.

Mr. HARVEY. Any other comments? Yes?

Mr. GORDON. For additional wildlife, I'd like to ask Mr. Ferrill some specific information. There is a raptor population of some significance along the southern, southeast coast, particularly including peregrine. Do you know how the peregrine population density is around there?

Mr. FERRILL. We've seen them islands, but I don't know how important they are.

Mr. GORDON. That was discussed.

Mr. HARVEY. You had something? Go ahead.

Mr. SOMERVILLE. Yes. Again, I would like to point out, we have submitted quite a bit of background data on this, but I would point out that the commercial fisheries are very extensive on the Alaska Peninsula, both shellfish and finfish, all salmon located in the areas and small streams on the Pacific side are very productive, as well as the large lake, longer river systems on the Bristol Bay side are very productive and have very heavy commercial and subsistence uses.

Obviously, in some of the four areas of the peninsula, the local people rely very heavily on salmon and shellfish. I also want to point out that some of the least known, but probably upcoming sport fishery potentials also lie in this area as well. Obviously, the silvers and grayling, other species that are very popular for sport fishing, the potential has well been realized on the Alaska Peninsula.

Mr. HESSION. This would come under the heading of wildlife oriented recreation. I noted early this morning that the Bristol Bay/Alaska Peninsula region seems to, in the statewide context, have the highest concentration of lakes, river systems. I think the Alaska Peninsula is not exception to this, in part because of the high fishery values of these systems. You have the rivers serving this wildlife concentration corridor and in the case of the Alaska Peninsula, several of them end at the major estuaries that were noted here by Mr. Leedy and as a result, you have a lake, river, esterine situation and because of the esterine attraction, and I should say that some of these rivers are under tidal influence, you have the opportunity to observe marine life, particularly the marine birds, shore birds and in some instances, several thousands of shore birds along these lower rivers. In all, ideal opportunity for wildlife observation.

Mr. HARVEY. Yes, sir?

Mr. CLINE. Dave Cline, Alaska Coalition. I'd like to ask a question of the Alaska Professional Hunters, if I may, regarding the trend in the number of commercial hunting guides operating on the peninsula and what process is being used to allocate hunting areas to, you know, reduce competition. Do you have any information on that or does the State, if you don't?

Mr. GUNLOGSON. Well, the last 2 years the State's guide licensing and control board has undertaken a project of attempting to allocate various areas that have been traditionally used by the guiding industry, individuals in the guiding industry, in a manner that will enable them to operate within an area and control the expansion of guides that are continually moving from one area to another or the rapid expansion of additional people into an area that is already—

perhaps contains as many guiding operations as it can support. At the present time, I believe the entire State of Alaska has now been treated in this manner by the guide board. I don't say all the problems have been solved, but specifically, in unit nine, the guide board has addressed the entire area and the map that I mentioned that we would produce for the record here is a map which shows the utilization areas that are allocated by individuals or to individuals or more than one individual. Based on the traditional use of the area, as well as investment in the area, going back as far as records are available, some people have been in the area for 20 years or more. Others have left, but at the present time, there should not be any additional increase in pressure in the area by the guiding industry, because it could be compared perhaps somewhat to the limited interest program of the fishery.

Mr. CLINE. Do you feel, then, that the peninsula is pretty well saturated in terms of the number of guiding operations that can successfully operate there?

Mr. GUNLOGSON. I would say that, yes, it is probably the most concentrated area of guiding effort anywhere in the State and this is probably true because of the fact that wildlife, the type of wildlife that is sought after by the trophy hunter is available there.

Mr. CLINE. I don't know if you have an estimate of the number of guides, approximately the number of operations?

Mr. GUNLOGSON. Yes, I have. Our list here shows there are 85 people on this list that are sharing a part or have a vested interest in a guiding operation on the—and this is in what we call game management unit No. 9.

Mr. LEEDY. I'd like to make an additional point on methods of transportation used in hunting. While Mr. Ferrill spoke both of Becharof Refuge proposal areas and the peninsula now, he didn't, in my memory, mention snowmobiles. The peninsula area is not always conducive to snowmobile use. As recently as 2 weeks ago, there was no snow on the ground for the major part of the peninsula in midwinter. However, other winters, snow is deep and snowmobiles are used extensively for harvest of caribou in particular.

Mr. SOMMERVILLE. A point I forgot in my notes here is to mention that we do have extensive site locations for fisheries enhancement, aquaculture and fisheries research sites on the Alaska Peninsula, which we'll also submit to you.

Renewable Resources

Mr. HARVEY. Thank you. Let's move on, then, to the renewable resource area, timber, agriculture, grazing, Dave?

Mr. HANSEN. Dave Hansen, Department of Natural Resources. It's quite easy to talk about these areas. Neither the Aniakchak Monument nor the Alaska Peninsula Range Area have any identification of timber potential. For agriculture, the Aniakchak Monument Area has no identification of agricultural potential. The Alaska Peninsula does, but it's limited to 71,000 acres of a 4.3 million acre area, and all the ratings are in the 9th to 10th percentiles.

Mr. HARVEY. Yes?

Mr. EPPS. Yes; I'd like to add to that and I'll alleviate maybe some of Jim's fears on reindeer grazing on the peninsula. It's very questionable whether this would ever occur and as far as other domestic animals being on the peninsula, again, I question whether it will ever happen, mainly because the bear seems to be the best rustler in there and they're having problems on Kodiak with that aspect of it. When I mentioned dairy in the area we were talking about this morning, this is confined housing where the critters are pretty well protected, and when you talk about out on the Aleutian Chain, itself, there you don't have the bear problem.

Mr. HARVEY. Any other comments on this area? All right. We'll charge on to the State, Native, and private land situation. Dave, do you want to give us a little rundown there?

State and Native Land Selections

Mr. HANSEN. OK. The State currently owns around a half million acres of the 4.3 million acres on the Alaska Peninsula Study Range Area. In the Aniakchak Monument Area, the State owns 11,000 acres.

In the Aniakchak Monument Area, we have very few conflicts. We only have an interest in about an additional 11,000 acres on the edge of the monument area. As far as overall State ownership pattern on the peninsula, we have a great interest in, I believe it was 1.3 million acres of the entire Alaska Peninsula. Now, that includes the Becharof area, the Becharof Refuge proposal area, on down to Cold Bay. The State's official position on this, which was referred to earlier today, is that everything south of the Katami addition should be put into a study area hold pattern. We have a great deal of interest in both selecting the lands and also agree, as everybody else has mentioned, that this entire area makes up an ecological unit which has a horrible land pattern now that's thoroughly confused between private, Native ownership, State ownership, State interest, and Federal ownership between different Federal management.

We also feel quite strongly on this area, because of its potential in many ways and its importance to the State, both from fisheries, some types of future development, general recreation, hunting, and also access and transportation corridors across the peninsula. The way the land pattern is now and the way the proposals are now, much of the development and needed access would be severely hampered. Overall, we don't feel that the Alaska Peninsula, from the south of the Katmai addition on down to Cold Bay, has been studied from an overall land use and land management perspective. It has been studied from a wildlife managment perspective and we feel that this is an extremely important area of the State. We're talking about close to 5 million acres and—but it should—option should not be foreclosed, including the Becharof Refuge area, and that the entire area should be put into a 3-year joint Federal, State, private study that would come out with some mutual recommendations and some value potentials could then be decided by Congress after it has looked at from all viewpoints.

Mr. HARVEY.Is that just on (d)(2) lands?

Mr. HANSEN. We'd love to make a new category called (d)(3).

Mr. QUARLES. Excuse me. How much of the acreage did you say you were looking at in the vicinity of the Caldera?

Mr. HANSEN. In the Caldera, it's only 11,000 acres.

Mr. QUARLES. But that's how much you own?

Mr. HANSEN. We own that much and we're also looking at about that much.

Mr. QUARLES. About a half of a township?

Mr. HANSEN. Yes, about half a township. And these are on the edge and we think in this area, compromise can be worked out. We are removing the Aniakchak Caldera proposal from what we feel should be in the study area, because we feel that conflicts are fairly minimal there. But the entire rest of the peninsula, including the Bescharof refuge area, should be in the study.

I'll move quickly to the Native ownership and come back to that later. On Native ownership on the peninsula, you have—the Natives have selected about 2.4 million acres in the approximately 4.4 million acre area. In the Aniakchak area, the Natives have selected 32,000 acres. We don't have estimates made on either one of those as far as what we expect the Natives to retain.

Mr. HARVEY. Any comments by the Natives on that?

Mr. BISHOP. The Aniakchak Calders, itself, has been in our homeland. It's in our selection. That is land that we have selected outside of Kodiak Island. The island, itself, didn't have sufficient land to comply with—I think it was 14–A3, two times the estimated lands that we were entitled to.

Mr. HARVEY. Do you share the State's view that the study which the administration and the House have proposed in the area is a good idea?

Mr. EATON. I'm not in a position to say at this point whether we would agree with that or not. This is something that just came up.

Mr. LEEDY. I'd like to direct a question to Dave Hansen.

Mr. HANSEN. Perhaps I should answer the figure question first. The half township, and we're talking about minor boundary adjustments, is on the west side of Aniakchak, well away from the main volcano, and it has to do with the transportation corridor that runs along the west side and also is on the edge of an oil and gas basin, which we already own part of and would like this additional 11,000 acres as oil and gas potential. That's the reason why.

Mr. HARVEY. Go ahead.

Mr. LEEDY. Bob Leedy, Fish and Wildlife Service. Dave, you spoke—you said earlier that the State had interest in only two townships in the proposed Becharof refuge.

Mr. HANSEN. No, I did not say that. That might have been a misunderstanding. I talked about Puale Bay.

Mr. LEEDY. Puale Bay, right.

Mr. HANSEN. Two townships around Puale Bay. In the Becharof refuge area, we have an interest in 490,000 acres, about half of the refuge proposal.

Mr. LEEDY. OK. That was a misinterpretation on my part, then. You spoke earlier of an overlap, but that was perhaps in the Morton/South Katmai extension.

Mr. HANSEN. Yes, when I mentioned minor overlap, I was referring to Aniakchak.

Mr. LEEDY. Yes. This was back in the discussion of the Katmai area.

Mr. HANSEN. OK.

Mr. LEEDY. And you said that there was a minor overlap with the peninsula.

Mr. HANSEN. With the Katmai proposal, right. But the Becharof proposal is quite major, about 50 percent of the proposal, we are in conflict with.

Mr. HARVEY. I understand that. Yes?

Mr. HESSION. Point of clarification, Mr. Chairman. As reported by the subcommittee, the House did not agree with the idea of a study for he Alaska Peninsula, as applied to the Alaska Peninsula Wildlife Range proposal and the Becharof Wildlife Range proposal. Both of those are established, but the study would include the Becharof Range. I might add another point, and that is that the State and others might——

Mr. HARVEY. You're better informed about what the House has done than we are, I'm sure.

Mr. HESSION. By the way, we support the contents of the study, overall. My other point was that the State makes much of an alleged confused land pattern. I don't think it is as exaggerated as the State would suggest. For example, on the north side of the peninsula is a solid block of State land. Down the center of the peninsula, you have solid 22-E lands, with some—of course, the Aniakchak being (d)(2), and on the Pacific coast side, you have Native withdrawals, much of which are overselected. Once those have fallen out, you'll have even more Federal lands there to form the nucleus, we hope, or the Alaska coalition does, of Alaska Peninsula Wildlife Range. I don't think, overall, the peninsula is any more confused in the way of land patterns than other areas I could cite in Alaska.

Mr. HARVEY. We're trying to prevent some of these areas.

Mr. HANSEN. Mr. Chairman, Dave Hansen, Department of Natural Resources. I'd like to maybe clarify what Mr. Hession was mentioning about the House action. The action was that the study area would include the Becharof refuge, but the subcommittee went ahead and still retained establishment of the Becharof refuge, even though it was in the study area. Part of the rationale for that was that you didn't have to do equal value trades with refuge lands, as you did with BLM. The State still feels very strongly and our position, to clarify it, is that no refuge should be established, but it should all just be kept in a hold pattern, call it a study or wildlife range study area, until the study is through and you've looked at the recommendations, rather than nominally proceeding to foreclose options by establishing a refuge.

Mr. HARVEY. All right. Thank you.

Mr. EATON. If the study would delay the conveyance of land which the Government has been dragging its feet on anyway, now, during the period of time they were going to be performing these studies, I'm quite sure that we would be opposed to it.

Mr. HANSEN. I can throw out a clarification that the proposal states that or takes for granted that the Native lands, as we support generally, would be conveyed as quickly as possible through this bill and the study would not hold that up.

Mr. EATON. In that event, I can see no opposition.

Mr. TILESTON. Jules Tileston, BLM. I'd like to reaffirm that. There is no intention to delay land selection conveyance. I would like, however, to make a plea for some type of rationality and here it goes beyond resources.

Mr. HARVEY. I hope you're not making that plea to us.

Mr. TILESTON. It goes beyond resources, which I realize is what you're expressing, but it really gets down to the issue of service to the public and efficiency in government. And some of the issues that you're looking at here on the Alaska Peninsula illustrate the very point that I'm making. You have a proposal for study which still leaves a substantial block of public land left between the end of Izembek and the beginning of the Aleutian Island Refuge. Those should be defended. That includes, among others, the Aumak area that I was just talking about, so that should be included.

Second is that we are seeing nice little patterns beginning to develop and they look very nice on the map, but 10 years from now when all of the conveyances have taken place, I can assure you from practical experience, we're going to have the Godawfullest mess of intermixed landownership and that as areas are established, any remaining Federal lands should go to refuge, if that's the area, or to the park, or this sort of thing, as a concept. And I would urge that, because what you're going to end up with is illustrated here and as an example, in the Iliamna area, there are nine townships in the Nikabuna Lakes area, which neither the State has expressed an interest in. It is not included in Lake Clark, it is not included in Iliamna. What does that mean? Nobody wants it. The Natives don't want it. BLM is going to end up trying to manage nine townships in the middle of no place. That sort of thing is not a service to the public, so when you establish your boundaries, please look at that.

Mr. HARVEY. Yes?

Mr. LEEDY. Bob Leedy, Fish and Wildlife. I'd just like to suggest that when Dave refers to a holding pattern, it has to be understood that this could not reasonably be a holding pattern, a unilateral holding pattern by one of the, what, dozen different landownerships involved throughout the peninsula?

Mr. HANSEN. Well, we're even giving up our State selections in that area, into a holding pattern, if they'll go with the study area, and taking for granted that new selections would not be confirmed in the Alaska Peninsula until after the study, based on this recommendation.

Mr. HESSION. Mr. Chairman, that raises a very significant question. Provided that Congress does not go along with the holding pattern or other interested groups, what happens?

Mr. HANSEN. As you'll notice, we've identified 1.3 million acres on the peninsula.

Mr. HESSION. That's correct. That's the point I'm driving at.

Mr. HANSEN. That we would push for selection on.

Mr. HESSION. On (d)(1) lands?

Mr. HANSEN. No, they're on a mixture of lands.

Mr. HESSION. I see.

Mr. HANSEN. What you have, though, is that we are openly admitting that we have not studied enough and nobody else has, to really make a determination that it's in the best interests for us to have those lands or if it's to be put into some other type of management.

Mr. HARVEY. Yes.

Mr. FIELDS. Yes. I'd just suggest, probably at the end of this entire 5- or 6-day session, that you'll probably find that it may be best to go back and study many of the areas.

Mr. HARVEY. Well, I assume that's going to happen anyway. Land use planning is a continuing, ongoing process that never stops, anyway. They have to make some decisions sometime.

Mr. SOMERVILLE. Just a couple of points and one question for maybe Dick Stenmark, too. One, as Mr. Hession pointed out the land patterns, I think we should all consider that tide and submerged lands are a very intricate part of the whole concerns here and very critical to many of what we consider national interest values in the peninsula. I also have a question for Dick. Dick, could you show approximately what the original proposed size of the Aniakchak Caldera was in the original proposal of (d)(2) areas?

Mr. STENMARK. The original withdrawal was right here, but there have been different versions of just how much land to put in that proposal. Everything from a narrower version of basically just surrounding the Caldera and the corridor along the Aniakchak, to spreading out a bit and including all of the Aniakchak drainage and the Cinder River country to the north.

Mr. HANSEN. What was the Morton proposal, Dick?

Mr. STENMARK. The Morton proposal was basically this brown line here. It contains the peninsula here, both Aniakchak and Amber Bay.

Mr. HANSEN. My understanding was of the original agreement that most of the Meshik and Cinder Rivers were not included in the Caldera park.

Mr. STENMARK. There may have been a little dropout on some of the country to the west here. I'd have to refresh my mind on that a little more.

Energy Resources

Mr. HARVEY. Let's move on to pick up the energy values and discussions. Who wants to kick that off? Go ahead.

Mr. SISSON. Alex Sisson, Alaska Oil & Gas Association. I'd like to take 2 or 3 minutes to mention the oil and gas possibilities of the Alaska Peninsula, because they are good and they are great and they are possible or probable. To date, the area that I'm talking about is between actually from Cold Bay, northeast to Kamishak Bay. Probably beyond Cold Bay, out into the Aleutian Islands, the potential on the land portion is negligible, but the area northeast of Cold Bay that is part of the large Bristol Bay complex basin, the Aleutian Basin and the southerly extensions of the St. George or the Bering Sea shelf, sediments lap up into the mountain ranges, the Alaska—the Aleutian drainage, both on the Bristol Bay side and on the Pacific side. There has been a lot of documentation of the USGS and different individual geologists that have put out information on this, on the Alaska Peninsula, but there still is a lot to be learned. I have in front of me a map to put out by the Geological Society of America, which shows the geology as this person knew it about 10 years ago. It has changed tremendously, not the geology, but the concepts and the ages and so forth and the potential. On this map in front of me, which you will get a copy of and—in small version form here, it shows all the sediments and all the general oil seeps and the anticlinal faults and so forth. These are petroleum geologists mostly with industry and with the governments, have met over the past, I'd say, 20 to 25 years or longer. The sediments range in age all the way from probably Permian up to the Tertiary. The sediments are both marine and nonmarine, mostly nonmarine, of clastics, from shales to sandstones, sandstones offering very good resource characteristics.

The thickness of the sedimentary section is at least from 0 up to 20,000 feet in some places. I cannot in this 2 minutes tell you the exact areas and the thicknesses of every area. There's been about 26 wildcat wells that have been drilled in the area, none have been economic. Some have found oil and gas. I have an in-company map here, which shows pretty much some of the oil and gas seeps and the oil and gas locations of the wells that have been—that have found oil and gas. A point that I want to make is that a lot of oil and gas shows have been found from Cold Bay north in the wells and also in outcrops. Structurally, there are large structures, anticlines, synclines, but anticlines for the formation of petroleum or hydrocarbon seeps—hydrocarbon reservoirs. I do not have a map here which will also be included, showing the structural trends that extend, again, from Cold Bay northward to the Katmai area which we're talking about. Again, as I pointed out before, there is a study of the area, say, of the Bristol Bay—I mean, the Bering Sea shelf and also the Shumagin shelf to the south, and we've got to understand what is on shore and what is visible.

In other words, again, a plea for access into these areas with outcrops. The concern of the Aniakchak National Monumental proposal, there are very important rocks right on the rim of that caldera, which to a petroleum geologist are—have been looked at and they are continually looked at and collected. The rocks range in age actually from Jurassic to Miocene and their exact thickness, we don't know. But it could be as much as 10 to 15,000 feet. In the proposal also, not in the caldera necessarily, but in the proposal, the proposed areas, there are two or three large anticlinal features which could be tested. The hydrocarbon potential in this particular national monument is really not known, but it does deserve some wildcat wells. Again, a plea for access.

I mentioned to you this morning concerning the Shumagin Islands. Again, the Shumagin Islands, along with a few other of the smaller islands to the south, like Sanak Island, have outcrops which should be looked at by the petroleum geologist, whether he is with the Government or with private industry. The access problem for the oil industry or for any industry is important. the access for a field geologist to get in there with his helicopter or whatever method he can, to pick up the sedimentary rocks for study. Also the access on the—particularly on the Pacific—on the Bering Sea side and the flat areas for seismic operations. for instance, in the Black Hills uplift area just north of Cold Bay, that area is flat country that could be prone to and could have done—could do seismic work. There, the subsurface of the Bering Sea Shelf sediments underlie the tundra. I mentioned there were questions concerning facilities. As far as the oil and gas industry is concerned, facilities in the Aleutian/Alaska Peninsula, I cannot say, "We would like to go here, we would like to go there."

Mr. HARVEY. You're talking about onshore facilities?

Mr. SISSON. Onshore facilities. I just want to mention this now. Generally or historically, an oil company in frontier areas, frontier areas which we call "frontier areas" are like the Alaska Peninsula. The system is, you have an oil and gas sale, the successful companies start drilling their wells, they either find or do not find petroleum. If they find economic reserves, then they go into looking for the facilities. There is one step before that, however, in order to arrive at a possible figure for dollars and cents of an offshore lease block, a company will make a tentative study as far as facilities onshore, as far as the cost of acquisition and the cost of facility construction, but they will not go into generally buying an area or going into it or leasing an area until a proven economic hydrocarbon deposit is found.

The company that I work for is primarily interested in geothermal development, geothermal areas, and the USGS will probably or might address itself to this today, but we stress that the areas, the general areas be delineated and be given somewhat of a reservation status as a future energy resource in the years ahead. Mr. Chairman, the Alaska Peninsula is so big for a geologist to tell you about it and as far as oil and gas, it's impossible, but it does have potential and I've gone over a little bit of the sediments. there is sediment, structure, and there's oil and gas.

Mr. HARVEY. Thank you. That was a very good job. Yes?

Mr. OVENSHINE. Yes. Tom Ovenshine, Geological Survey. In the process of publishing an onshore petroleum resource estimate for all of Alaska, the Geological Survey's resource analysis group in Denver prepared a petroleum estimate for the Alaska Peninsula subprovince and I'd like to give that to you. Considering an area underlain by sediments of 14,531 square miles and a sedimentary volume of 46,730 cubic miles, the statistical mean value for undiscovered recoverable oil is 0.24 billion barrels. That's for the whole province. In terms of gas, concerning the same area, and sediment volume, the estimate is 0.41 trillion cubic feet. I think this underlines what Dr. Sisson said about the importance of this province.

Mr. HARVEY. Thank you.

Mr. HANSEN. Could I ask a question? Just to help some of us nongeologists and oil and gas people to get a feel for this, as far as that reserve, how much do we take out of a place like Prudhoe Bay usually, compared to that, or I mean, how does this compare, just when you say 0.24 billion barrels?

Mr. OVENSHINE. I think the current reserve estimate at Prudhoe Bay is about 9.9 billion barrels. Remember, that's one of the giant oil fields of the world.

Mr. HANSEN. I understand that. I would also like to ask for some State comments on oil and gas potential on the peninsula. As you're aware, we have selected a good deal of the western side of the peninsula, primarily for oil and gas potential. If you take the Udall proposal area, which is primarily existing Federal land and Native holdings on the peninsula, of the 4.2 million acres, approximately 770,000 of those acres have some oil and gas potential. A good deal of this potential is rated very high by the State and is in the first and second percentile. About two-thirds—about 670,000 acres of the 770,000 acres is rated in the top 10 percent. Most of this is along the west side of the peninsula, adjacent to existing State land holdings. In the area of coal, there are also some scattered coal outcroppings on the peninsula, but generally they're ranked very low in the State's assessment and are not of a good deal of commercial value, though exploration could still be justified in that area. But generally, the State does identify very good potential oil and gas there.

Mr. Harvey. Any more comments on the energy aspect?

Mr. Reffalt. Yes. Dave, you can correct me if I'm wrong on some of these statistics, but in reading through your statistics, it occurs to me that something like 72 percent of the oil and gas potential on the peninsula is stated by you to be in State ownership or will eventually be in State ownership, an additional 12 percent in Native ownership and only 17 percent occurring on the Federal lands. Is that about correct?

Mr. Hansen. If you include the entire Alaska Peninsula, including all of the existing State lands, but not the Udall proposal.

Mr. Reffalt. No; I'm talking about the Andrus.

Mr. Miller. Tom Miller, with the U.S. Geological Survey. I'd like to comment briefly on geothermal energy potential on the Alaska Peninsula. There are at least eight volcanic areas that we think have at least some geothermal potential. Of these three, Emmons Caldera, north of Cold Bay, of which Pavlof Volcano is part, Aniakchak and Veniaminof Caelderas are by far—have by far the largest potentials. Aniakchak alone, and again I won't bother with the numbers, but it comparatively would contain somewhere around 6 or 7 percent of the heat content of high level magma chambers found in the Aleutian volcanic arc. If you were to exclude those lands already in the Aleutian Islands Wildlife Refuge, it would be about 12 percent. Then Veniaminof would be approximately the same size. Emmons Caeldera, which is the largest caeldera in the Aleutian Arc, would contain something like 12 percent of the stored heat content or 24 percent, excluding the Aleutian Islands Wildlife Refuge. Some mention was made to Okmok Caeldera on Unimak Island in the eastern Aleutians. That would be—that has an estimated stored heat content slightly larger than Aniakchak or about 8 or 9 percent of the stored heat content.

Mr. Harvey. Any other comments on energy?

Mr. Sisson. Just one comment. Dave, it is impossible, it seems to me, to compare percentiles in a frontier area, versus Prudhoe Bay, like you and your other cohort here did when you talked about 9.9 billion barrels in Prudhoe Bay. But the frontier area is the Alaska

Peninsula. If you took Prudhoe Bay out of there, then you wouldn't have those billions of barrels.

Mr. HANSEN. Not necessarily. I think the only point of our comments back and forth was to get a feel for what the magnitude of—I believe it was 0.24 billion barrels and was related to something we're more familiar with and so——

Mr. SISSON. Well, it couldn't equal that much in the Alaska Peninsula.

Mr. HANSEN. I think it's accepted that we're dealing with a probability.

Mr. SISSON. I just wanted the committee to know that.

Mr. OVENSHINE. Tom Ovenshine, Geological Survey

Mr. HARVEY. That's the biggest oil and gas problem.

Mr. OVENSHINE. I probably should have read in also that the range in the estimate was as high as 1.1 billion barrels for the province.

Mr. HARVEY. Yes?

Mr. TILLESTON. Jules Tileston, BLM. On geothermal, there was some drilling at Adak or there was scheduled drilling at Adak by Naval Research Lab this last summer. Do you know what happened with that?

Mr. MILLER. Yes; the Navy contracted with the Geological Survey on the study, geophysical and geological, on the geothermal possibilities in the north part of Adak Island on the naval base. We concluded this work. As a result of our studies, the Navy put down three—four research holes, very shallow depths, they had a very small rig to—the deepest hole was 2,000 feet. The primary purpose of this hole was bottom hole temperatures and some heat potential. They are presently trying to calibrate their deepest hole, the 2,000-foot hole, to get a decent bottom hole temperature, however, it is somewhat encouraging.

Mr. HARVEY. Why are they doing this?

Mr. MILLER. For hot water space heating primarily, to get geothermal energy. We don't anticipate hitting a resource of sufficiently high temperature to generate electricity, but there could be a resource found. On the basis of what they find out on the bottom hole temperatures, they may try to get a bigger rig and drill the four additional holes.

Mr. HARVEY. Yes?

Mr. CLINE. Dave Cline. I wonder if I could address a question to Doctor Miller here? Of the nongeothermal resource on the Alaska Peninsula, do you see any development potential for the foreseeble future and if so, where would the energy most likely be marketed?

Mr. MILLER. Some time ago—well, a few years ago, the mining company had a development co-op agreement with the Aleut Corp., looking for copper in particular, and they, for example, were interested in geothermal energy in terms of—if, indeed, they found sufficient copper to be mined and so on, as a power source. This is slightly further down the peninsula and into the eastern Aleutians, but I assume the same would hold for copper discoveries that might go into production on the lower part of the peninsula. Otherwise, there is a problem with geothermal energy, that it is not a readily transportable form of energy, in and of itself. Long distance transmission lines are becoming more and more feasible, but they're not particularly esthetic and there are problems that are associated with those. But I think it would be the local use for copper——

Mr. HARVEY. What they define as long distance in geothermal is pretty darn short.

Mr. MILLER. That's right. And the other possibility that has been discussed is the possibility of industries like the logging industry that demand large amounts of cheap energy which they may conceivably locate in places where they're looking for it.

Mr. HARVEY. Thank you.

Mr. TILESTON. Jules Tileston for the BLM. I can't speak for the Aleut Corp., but at least as recently as a year and a half ago, they were considering geothermal steam for also agriculture and production of local crops and vegetables. You're dealing here again with an extremely long distance area and transportation costs are very high and geothermal may well be something which, today, we consider far out, but when you get down to the local and the practical situations, it's very feasible.

Mr. HARVEY. Yes.

Mr. BANNISTER. I have just one clarification for the record. I believe, did you not mean 1.1 billion, Tom, rather than 1.1 million you said?

Mr. OVENSHINE. I thought I said billion, yes.

Mr. HARVEY. I thought he said billion, too.

Mr. BANNISTER. Maybe I misunderstood.

Nonfuel Mineral Resources

Mr. HARVEY. But now we're sure he said billion. All right. Let's go on to the nonfuel minerals. Anyone want to start that off?

Mr. BANNISTER. D'Arcy Bannister, Bureau of Mines. On the southeast side of the peninsula is the same general trend as in the Katmai area. There is a very high potential for copper-molybdenum porphyry, and known typical copper molybedenum porphyry systems. This is a map of the area between Aniakchak and Becharof Lake that shows some but not necessarily all of the anomalies and deposits.

Mr. HARVEY. Anybody else? Park Service?

Mr. JONES. David Jones with the Park Service. In connection with our mineral studies in Alaska, the mining engineer attached to the Northwest Region and stationed in Spokane—Clint Reed—was the man that did the bulk of the work. He was the man that abstracted from the Kardex System of Alaska, the location of mineral property and placed them on appropriate quadrangle sheets. We found one, no locations of any type in Aniakchak. We didn't think it was worthwhile to spend any money on a contract either, so nobody's gone to look at it. But there were no locations.

Mr. HARVEY. Thank you, Dave. Those, I assume, were on the boundaries of the original Morton proposal?

Mr. JONES. Only on the Morton proposal.

Mr. HARVEY. Thank you. Any other comments.

Mr. FIELDS. OK. Ed Fields from the Alaska Minner's Association. A number of companies have spent quite a bit of time exploring for minerals up and along the peninsula there. Duvall Corp. and Bear Creek Mining Co. have worked in conjunction with the Native corporations in exploring the mineral potential on their lands. We consider this highly favorable for these porphyry copper type deposits, based on the fact that this is very similar terrain to some that is known as the ring of fire, which extends around certain Pacific regions. There are certain geological features which are associated with the margins of the Pacific Ocean, which are favorable for this type of occurrence. In South America, you have a large number of porphyry coppers that extend up through Central America, to the Western United States [indecipherable], to British Columbia, and then on the other side of the Philippines and Bouganville in the South Pacific Islands. All of these have porphyry copper systems. The one remaining unexplored area up to a few years ago was the Alaska Peninsula and this has been an increasing amount of explorational activity. We have identified something on the order of ten porphyry copper systems along the peninsula.

Three of these have been drilled to date. One of the three has indicated—tonnages and grades which are similar to the type of production that's going on in British Columbia, certain types of deposits. The other seven deposits that have been recognized here have not been drilled to date, but at some stage, these will probably be researched, so we feel that this has very high potential for mineral occurrence, which makes up a major basis for our copper resource in that area.

I do have a map for the record here, which identifies all of the major prospects and also many of the anomalies which were recognized on the peninsula, as well as some pictures of the peninsula, showing some of the beauty and grandeur and cloud and fog, these aspects that go with it.

Mr. HARVEY. Thank you again. Dave.

MR. HANSEN. Yes. Just a brief comment. Looking at Udall's proposal for the Alaska Wildlife Range, our hard rock mineral assessment, first of all, the same qualification we made, very little work has been done in this area, but basing this on all the information that's available now where the range—most of the had rock minerals in that area are below the top three 10 percentiles. There's 2.7 million acres in this 4.4 million acre area that can be said to have some potential. Of that, with the exception of 29,000 acres, the rest is rated primarily in the fourth, fifth, and sixth percentiles for minerals, statewide. That's comparing it to the 187 million acres of mineral potential in the State.

KODIAK ISLAND AREA

Mr. HARVEY. OK. Thank you. Any other comments? All right. Well, that is it on that area. We do have one thing you might want to treat and that is the proposed wilderness designation on Kodiak. I don't know if anyone here wants to make any comments on that proposal.

Mr. GORDON. Richard Gordon, Alaska Coalition. The first comment I would make is pretty distinctly obvious, that we really can't make any determination until the land situation is clarified. From the wildlife point of view, the area is all outstanding bear habitat, except for portions of the eastern edge, and I'm sure Jim can comment more specifically, but from the point of view of visual characters, the fjords on the northwest central and southwest central areas, it's fjord system and series of lakes, which have enormous fishery values for red salmon. Probably the most dramatic scenic point, I won't describe the characteristics, but suffice it to say that the wilderness here, the quality is superb. However, the area does have villages all the way around and the shoreline is quite conducive for fisheries, for camps, and so forth. There are a number of camps in the interior, but certainly in terms of its characteristics, partically the whole refuge would qualify under the Wilderness Act. But it's impossible to judge it at the point, in my judgment.

Mr. EATON. Hank Eaton, Koniag. Kodiak is third largest—probably fourth now, because we're vying with Dutch Harbor. It's the either third of fourth largest fishing port and landing in the United States. We harvest practically the year round, scaup, crab, and that includes tanner, king and dungeness, shrimp, salmon, and now looking towards getting into aquaculture. Now, as to aquaculture, I want that separated from the hatchery program, because we're looking at aquaculture in terms of profitmaking.

The development of the snail and sea urchins, of the types of foodstuffs that are not used by the Anglos, but by the Asiatics, and there's a big demand for this and we're looking into that at this time. But the entire Kodiak Island is a large salmon producing area. We probably produce more shrimp in Kodiak or have in the past than any other port in the United States, and at one time, we produced more shrimp than all of the Scandinavian countries put together, just the little community of Kodiak. We have at the present time approximately 13 canneries within the city limits, all along the waterfront. The fact that they're about 75-percent Japanese owned, why, we'll skip over that. But the resources that we haven't developed and we're looking forward to developing, as a result of the extended jurisdiction, the 200-mile long, is almost unlimited in terms of what we can do and I think this also is something that the entire Aleutian Chain is looking towards, because 65 percent of all the proceeds that comes out of the sea, out of the Pacific Ocean, it comes out of the North Pacific and you can rise 10 times more food, more protein in an acre of water than you can on an acre of land.

So the areas that we're talking about when we talk about Kodiak Island, one of the richest in sea resources of any place on the Pacific coast, and I'm not talking from the chamber of commerce either. That's from experience. I was born and raised on Kodiak Island, except for a short period that I lived in America for an education and then I came back home. But I've lived in Kodiak for 40 years and I'm well aware of what there is there and what the potential is.

Mr. HARVEY. Do you think that the wilderness proposal would give you a problem?

Mr. EATON. Depends on how we develop the lands we're selecting at this time, Mr. Chairman, and it's hard to say. The gentleman from BLM indicated another 10 years before we get conveyance of land a few minutes ago. If this is true, then forget the settlements.

The land settlement, the Native settlement is in the land. Good God, with $462,500,000 that the Government gave us, we could keep the Korean war going for 30 days and yet they make a big deal out of that. It isn't. It's the land that we're interested in. To hell with the money.

Mr. HARVEY. I think Mr. Tileston did say, to defend him, that he was talking about something that would happen 10 years from now. I'm not sure he meant to imply it would take 10 years for the conveyance.

Mr. EATON. Having trusted them now for some almost 10 years that we've been involved in this thing, I've gone through three Assistant Secretaries of the Interior. Just the time you get one educated, why, they bring in another one on you, and I really don't have that much confidence in the BLM, to be honest with you.

Mr. HARVEY. Any other comments? Yes, go ahead.

Mr. CLINE. Dave Cline, Alaska Coalition. The Fish and Wildlife Service did, of course, conduct a wilderness study of the Kodiak Island Refuge and that was, I don't believe, ever forwarded to the Congress, because of the complications of Native land selections on the island, but it did come to the conclusion that with minor exceptions, the entire refuge would qualify for wilderness designation and would be essential for continued protection of viable populations of Kodiak brown bear, along with other wilderness oriented species or dependent species, including, of course, bald eagles, but also the fisheries, the salmon fisheries, so I don't think we should forget the need, if we're going to have a viable wildlife refuge there and its brown bear populations, I think we have to take a very close look at possible wilderness designation, at least for those portions of the refuge that remain, and I don't think we'll be successful on the island with wilderness management without well-thought-out and integrated cooperative management agreements with the Native landowners. Once they've decided how they, you know, wish to manage their uplands. As Mr. Eaton mentioned, the people there have always depended pretty much on the sea and it may or may not prove desirable to develop the uplands that they are selecting for ownership and if that does not occur and cooperative agreements can be worked out, I think in the future we can, in fact, designate some wilderness on the island and manage the refuge for its bear and other wildlife resource values in the national interests.

Mr. HARVEY. I'd like to ask you one question. You said that you thought that the wilderness designation was essential to the preservation of the wildlife. Why?

Mr. CLINE. Because particularly the bears are dependent on remote habitats, relatively undisturbed by human impact, particularly developmental impacts associated with roads or community expansion.

Mr. HARVEY. Can't the Fish and Wildlife Service control that kind of thing under existing law?

Mr. CLINE. That may or may not be possible, depending on the development thrust that the island is subjected to in the future. All wilderness would do, of course, is protect existing wilderness values and give the Agency a stronger hand in dealing with any possible development initiatives in the future that they might not be able to deal so well with without those classifications.

Mr. HARVEY. Yes. There's no question that it would remove a good deal of their discretion.

Mr. EATON. May I reply to that?

Mr. HARVEY. Sure.

Mr. EATON. The Kodiak Island, the whole archipelago, I guess, has been the subject of much reserach by archeologists and up to now they have discovered and identified and located approximately 600 village sites. They have yet to find one on the interior of the island.

So when you say that they are people of the sea, I think that corroborates it very well, because as far as I know, none of the village corporations at this time—in fact, we objected very strenuously at some points to having to accept land that was off of the coast, because we, personally, can see no use for it. We're not agricultural people, although the island, itself, lends itself well to agriculture. We've had people from the States come in and they've looked it over and said that the potential there for agriculture and animal husbandry is great. But the bear, of course, poses a problem as far as cattle are concerned. And which is more important? Are we going to develop industry or are we going to, you know, allow the bears to roam at will? This is something that we're going to have to decide. As far as the birds are concerned, I think selective hunting and the Department of Fish and Game will have to back me up on this, because I've got statistics of theirs to prove it, that selective hunting of bear on Kodiak Island has been substantially reduced in size over the years and right now, the average sized bear taken off of the island, I don't believe compares anywhere near to what you can get off the mainland. If I were going to go black bear hunting and I guided for 6 years on the island, so I know what I'm talking about, I'd go down to the mainland. I'd go over to Kukak or I'd head down White Bay or someplace like that. I wouldn't go hunting for bear on the island. I don't believe there's that many big ones left.

Mr. SOMERVILLE. Two or three comments to Mr. Eaton. One is, the bear size, skull, and height size, on Kodiak did decrease, but I think you'll probably admit in the last 2 years, under very more restrictive regulations and closer control, that some of the height sizes and skull sizes, in fact, increased in part of the areas on Kodiak Island. I'm not saying all of it. By the way, one of the areas has one of the densest bear populations, which is kind of contradictory to what both Dave Cline and I have said about their being a wilderness species, is on the cattle ranches to the east, despite all efforts of everybody to keep the bear populations. We try to push hunting pressure into these ranches, in fact, to offset some of the pressures by the bear and the bear seem to be thriving, despite everything.

Mr. EATON. They've lost their fear of man. They do not hesitate to roam through inhabited areas, where before we haven't had that problem.

Mr. SOMERVILLE. Specific to the wilderness and, I guess, on conjunction, just elaborating a little bit on what Dave said about the study, we have submitted quite a bit of material to the Fish and Wildlife Service and I think they agreed with that there should be some exception for the fisheries enhancement project potential. Kodiak does have quite a few and we will submit those again to the committee.

Mr. HARVEY. OK. Bill, you had some comments?

Mr. REFFALT. The Fish and Wildlife Service did complete the wilderness studies on Kodiak. I think the Fish and Wildlife Service does believe that there are——

Mr. HARVEY. Would you furnish us with that study, by the way?

Mr. REFFALT. I'd be happy to. The Fish and Wildlife Service does believe that there are species of animals, a number of them in Alaska, that require essentially wilderness conditions to really flourish. The situation that we face in Alaska of having had in the past almost no development, almost no access and so forth, perhaps, did not require the designation of wilderness and I think those are the conditions that are changing now that would warrant—bring us to want to take a very close look at wilderness designation as a management tool, if you will. I think that you can oftentimes say that the bears, for instance, can survive as is proven by places in the lower 48, but whether that is, in fact, maintaining your bear populations is another question. I think most people would agree that these wilderness species require the large untrammeled areas to survive as a natural species, so that's the difference that we're talking about.

Mr. HANSEN. I might just make a comment. First, that the people of Kodiak are, indeed, people of the sea is quite well illustrated by their economy. It's, as everyone knows, almost completely oriented to the sea and and the fishing industry.

Mr. HARVEY. The island is almost entirely surrounded by water?

Mr. HANSEN. We've talked a lot about the farming industry or the cattle grazing and also big game hunting. Those each make up about 1 percent or less than 1 percent of the island's economy in both cases, so there is a lot of potential. The only other point might be that the agricultural or the farming on the island, such as the cattle raising, after a couple of old homesteaders up in the mountains died who guarded the passes, the livestock production went down significantly.

Mr. HARVEY. Yes, Jack?

Mr. HESSION. Yes. I'd like to return to the peninsula for a moment and say that the National Park Service did a wilderness study of the existing Katmai Monument and they found that, for all practical purposes, all of it qualified for wilderness and part of the reason for that is the needs of the brown bear, the wilderness habitat protection. The reason, the basic rationale for the proposed north and south additions to complement that existing monument habitat, as you know, the present monument boundaries are somewhat irregular and do not simply terribly reflect the watershed divide and at this time, if I may, I'd like to have Mr. Gordon explain the ecosystem concepts that lie behind the coalition's work in South Katmai. Would you like to just take a minute or so?

Mr. HARVEY. Sure. Is there some reason that we skipped over this before or——

Mr. HESSION. I think it's important in the context of what we've been talking about here, both with regard——

Mr. HARVEY. No, I'm not questioning its importance. I just wondered——

Mr. HESSION. We didn't really hit it precisely.

Mr. HARVEY. OK.

Mr. GUNLOGSON. OK.

Mr. HARVEY. Oh, I'm sorry. Did you want to make a comment first?

Mr. GUNLOGSON. Dick Gunlogson, Professional Hunters. I just have a problem with this concept of setting up a wilderness area and then setting up an area to protect the wilderness area and then setting up an area to protect the area that's protecting the wilderness area.

Mr. HARVEY. All right.

Mr. GORDON. Just let me make one thing clear, and partly in response to that, is that setting up a wildlife sanctuary and setting up a wilderness area are not necessarily the same thing, they're not necessarily for the same purposes, they are not both necessarily required in any given case. In the case of Katmai, the primary concern is what we generally call the wilderness species, unless they're chewing on cows, the brown bears. The concept of the coast ecosystem, which has been much misused, it's a buzz word really, is what it is. Mr. Tileston raised this point. The idea is that in each of the major, if you will, habitat sites and in areas where there is really a significant, if not outstanding, population in relation to the habitat and in which the habitat itself is extremely productive, that there be certain areas, a few—in this case, in Alaska, I'd say about five—in which a very, very large acreage of productive land would be set aside from all uses by man, whether they're commodity or noncommodity, which would be likely to put pressure or substantially change either the numbers of the populations of various animals, particularly the key to wide ranging, so-called wilderness species, or the effect to habitat in such ways that over the long run, these species might likely live differently.

This is not the same thing as talking about maintaining numbers. It is not the same thing as talking about maintaining large size, although obviously both of these things could be of benefit, but they can be done by management. The idea in simple terms is, if you can set aside an area large enough—and there is no defined way to say what is large enough, it's a matter of degree—you can maintain populations of a good number, mostly—in some cases, most of the species within that area, so over a large part of the area within those boundaries, these species live in a condition as though man did not exist. This is a direction to be aimed for, it's an ideal, it's a goal. It's not something you can perfectly reach. Up to a certain point, it's sort of a bell-shaped curve kind of thing. Up to a certain point, and you call it studying the particular population or the particular resource, and it could probably define where the curve flattens out. Up to a certain point, you've gained a great deal by increasing the size of the protection. The North McKinley concept, the Katmai expansion concept. But beyond that point, the gains become incrementally larger, but not significantly larger. The goal, again, would be to maintain a relationship between all of the species present, the big ones and the small ones, in such a manner that they were existing in terms of age structure, size structure, social structure, relationship with one another, movement patterns, everything else, as though man did not exist, except along the periphery. It's a goal, it's a concept, it is something which can be done only in Alaska, in the United States, and the concept is not to do it in 20 or 30 small places around Alaska, it is not the same thing as a wilderness concept.

The idea is in each of the major ecological types, if you will, of Alaska, you could relate it to some extent to that map over there, that there be one really large area, large enough to encompass most or all of the year-round habitats for most of the species in a sufficient form so that those species would act as though man did not exist most of the time. You can't do it for caribou, but you can do it for a lot of the other species. As I say, it's not something that you have to have in order to maintain wildlife populations. It is simply one means, one type of land management to achieve that particular goal. It provides you, among other things, with a genetic base of animals which have not been affected by harvesting. Now, of course, that, no biologist knows, but that is one advantage. The main advantage is simply that you have a large control in which nothing has happened, and when you compare this to all the things that have happened outside, again, let me repeat the idea is, a few larger, rather than a lot of smaller areas.

Mr. REFFALT. One final statement on wilderness and just let me summarize the whole region, as far as wilderness studies within the Fish and Wildlife Service on the refuges. The Kodiak area was studied and our position was that, at this time, with the complexity of land patterns and the time frames, that we did not feel it should be recommended for wilderness. The Aleutian Islands, we felt we did know the land patterns sufficiently at this time and that we could make a recommendation that would be suitable there. Izembek has been studied and the study completed, but we're uncertain about some of the landownership patterns there, sufficiently that we did not feel that we could make a recommendation without at least another year's study.

Cape Newenham was not studied for wilderness. It came into the system after the Wilderness Act passed. Several of the island areas that were included in the marine resources proposal by Secretary Andrus are in wilderness today. The rest of them, we felt could go in because they're fairly simplified. And that pretty well sums up the wilderness.

Mr. SILVER. You said there were five areas, is that correct?

Mr. GORDON. Yes.

Mr. SILVER. What are the five?

Mr. GORDON. In northern Alaska, the gates of the Artic region, and in this case I will have to get in a plug for a policy, namely, that you deal with ecosystems not in terms of scenery, but in terms of habitat. And therefore we're talking about foothills as well as mountaintops. And second, McKinley and its northern extension, certainly Katmai, along with what is now proposed as Becharof, and this is one place I really disagree with the State. This is a place where we're talking about the formerly south extension proposed, which is now proposed as a refuge, plus the northern extension. Fourth, Glacier Bay, along with its proposed rather small extension. Fifth, the Kluane Game Sanctuary in Canada, plus the easternmost portion of the Wrangell Mountains, which comprises the continuation of that same ecosystem. The majority of the Wrangell Mountains, which comprises the continuation of that same ecosystem. The majority of the Wrangell Mountain proposal, I do not conceive as a sanctuary.

Mr. SILVER. Thank you.

Mr. HARVEY. Very good, thank you.

Mr. TILESTON. I would just say that if this major ecosystem is ultimately achieved, that the final thing will be achieved there and that man will not exist anywhere in or around the areas, because it's not even going to be available to them.

Mr. HARVEY. Is that ego or eco?

Mr. TILESTON. Depends on whether you're talking about nature or people.

Mr. HARVEY. Any other comments? All right. we stand adjourned until 9 o'clock tomorrow morning.

Mr. TILESTON. Just 1 more minute, please. I would like to respond to this question, for the record, on Hank's thing on 10 years, because this is a very sensitive, it's a very controversial issue and I'd not like to let it lay. I'd say 10 years on several bases.

The State has a number of years to complete its selections and at this point, all its doing is indicating where it would have liked to select in the same way that in 1972, large areas were set aside for the regions. These indicate from which they selected. So we've got a major uncertainty there. Second, we will be conveying core townships and those selections, but until we get the survey done, we still—you know, you're going to have 40 acres, 120 acres and this sort of thing, which eventually what's going to—which, is it homesteads or something like this, or navigable water, which will not count against your total acreage entitlement and the conveyances, so as a result of litigation in those types of issues, 10 years from now, we're still not going to know pieces. Pieces. They'll be small pieces, but the major parts will be conveyed.

Mr. EATON. We expect that, because litigation with us has not become a way of life.

ALASKA NATIONAL INTEREST LANDS WORKSHOPS

WEDNESDAY, FEBRUARY 15, 1978

ANCHORAGE, ALASKA

THE CENTRAL ALASKA REGION

Mr. HARVEY. I think there are some folks here today who have not been with us before. Just a couple of ground rules, one, no smoking in this room, two, when you do speak for the record, please be seated at the table. If you have a representative there, you can switch back and forth. The microphones are sensitive, you don't have to move them around, but talk near a microphone and identify yourself for the record, so that when we have a printed record, we'll know who it is that's talking at that particular moment. Today, we're beginning the so-called central Alaska area.

We're going to start this morning with the Lake Clark area, which Dick Stenmark will review briefly in just about a minute. We'll move on from there to Mount McKinley. From there to the Kenai Peninsula. That may well be all we can get done today. Tomorrow, we will take up the Wrangell Mountain area and, depending on time, pick up some of the issues of the Chugach Forest proposal, either today, late this afternoon or tomorrow. But for those who have an interest in a particular area, it will be Lake Clark, McKinley, and the Kenai today, and the Wrangells, not until tomorrow. And once again, we will try to run through the same format we've been using. If anyone doesn't have the sheets, which list the resources that we've been attempting to cover one at a time there are some available in the back. I would say again, for the record, that the purpose of these workshops is to gather information about present resources and their uses and potential uses of the resources. The committee will be considering policy issues with respect to those resources, for example, subsistence use policy, access policy, mineral development policy, at a later time. The purpose of these meetings is to get resource information. Dick, I'll ask you to set out the parameters of what it is that we're talking about when we speak about the Lake Clark area.

Mr. STENMARK. I'm Richard Stenmark of the Land Use Planning Commission. Before launching into the Lake Clark area, I want to give a little bit of an introduction to the regional context in which we're viewing these areas for the (d)(2) land proposals. As defined for our purposes here, the central Alaska region will include the Tanana Valley, all of the Alaska Range, down through the Lake

Clark area, the Susitna Valley, Talkeetna Mountains, Kenai Penninsula, and the Chugach, Wrangell, and Saint Elias Mountains, and this region, then, borders the Yukon Territory on the east and the Gulf of Alaska on the south. This is an area of about 86 million acres. Nearly three-fourths of Alaska's population lives here, concentrated for the most part in several large centers, Anchorage, Fairbanks, Kenai, Soldotna, down the peninsula, to name a few. Slightly under half the population of Alaska is residing in the Anchorage area. The principle road network in Alaska lies in this region, the Alaska Highway, the Richardson Highway to Valdez, Parks Highway, Fairbanks down to Achorage, and the road network down on the Kenai Peninsula. Aircraft is used extensively, however, to reach outlying areas. The State's only major railroad also lies in this area, operating between Seward and Fairbanks. There are also two international airports here, one at Anchorage and one at Fairbanks. Major industry and sources of employment are largely urban, and include such things as government, construction, wholesale and retail services, oil and gas exploration and development, commercial fishing, the Prince William Sound, Lower Cook Inlet areas, small scale mining operations, including a coal mining operation here at Healy that's been going on for many years.

Some timber harvest takes place, mostly in the Cook Inlet, Lower Kenai Peninsula, and some of the coastal regions here along the gulf. There is some farming in the Matanuska Valley north of Anchorage and also some in the Tanana Valley between Delta and Fairbanks. Also tourism, including guided hunting and fishing, with several major focal points, such as Anchorage, Homer, and Mount McKinley National Park. Climate varies in this region considerably with moderate temperatures along the coast and also heavy snowfall and rainfall along this coast, ranging then on into continental climate of the interior, with warm to hot summers and subzero temperatures common in the winter. The variety and quality of scenic, primitive, vegetative, minerals, wildlife, and other resources in this region is superb, and I'm not going into them since that's what most of you will be addressing in detail. Considering the present land holdings or selections and likely additional selections, the State's Native corporations will hold more than half of the land area in this region. Existing Federal reserves in the region consist of the Chugach National Forest, which involves most of the land surrounding Prince William Sound, portion—the eastern portion of the Kenai Peninsula, the Kenai Moose Range on the west side of that peninsula, Mount McKinley National Park up here, the smaller Tuxedni National Wildlife Refuge across the Cook Inlet. There are several military reservations, some around the Anchorage area and then larger land areas involved at Eielson, and the Blair Bombing Range and so on in the Fairbanks area. I Might mention also that the State has also reserved substantial acreage in this region, in five parks or recreation areas. The Chugach State Park behind Anchorage, the Katchemak State Park down on the Kenai Peninsula, Denali State Park, the Nancy Lake Recreation Area, and the Chena River Recreation Area out of Fairbanks.

National interest lands focal points in this region include the Lake Clark area, which is basically being proposed as a park. The Kenai Fords area, over on the south side of the peninsula being proposed as a park of as a monument, depending on the different bills. These are all new areas. The Wrangell/Saint Elias complex, variously proposed or parts of it, as park reserve, as national forest and some portions as national wildlife refuges. There are also some wild and scenic river proposals in this area, depending on the different legislation, some would be, designated for study. These include the Forty Mile River system, the Delta River, the Gulkana, Tazlina/Nelchina, the Copper River, and the Susitna River. Additions to existing Federal reserves include those to Mount McKinley National Park, the Kenai Moose Range at the southern end and over at the northeast corner, and additions to the Chugach National Forest, primarily in the Nellie Juan/College Fjord area and lower Copper River areas. I believe that covers everything there.

LAKE CLARK AREA

The Lake Clark area, which we'll start out with then, we'd like to have you address your remarks to all of that land area from just north of Iliamna Lake on up through the headwaters of the Stony River and the Chilligan Rivers up in this area, and westward down the Mul—yes, the Chilikadrotna/Mulchatna River area a ways, and over to the Cook Inlet Coastline.

Scenic, Landscape, Historic, and Archeological Values

Mr. **HARVEY**. Thank you, Dick. Well, we'll start off with the scenic, landscape values, historic, archeological, et cetera. Does anybody want to open up here?

Mr. **SANDBORN**. Mr. Chairman, my name is Roy Sandborn and I'm with the National Parks Service. In 1950, the Lake Clark area was proposed as the Lake Clark National Park. In 1962, it was further identified and marked for America for study as a national park. we have completed 6 full years of study since that time and they're continuing now with the Cook Inlet Land Use Study for this area, which was proposed for the Cook Inlet Land Exchange in the 94th Congress. This area has been described as the Switzerland of Alaska. It's a place where everything comes together in Alaska as far as resources are concerned. It's a place where the Aleutian Range meets the Alaska Range in the Chignik Mountains. Paul Fritz will point out the areas on the map as we talk about them.

At the north, we have Merrill Pass, which is a major flyway and entryway into the area, crossing east to west to the proposal. Lake Clark Pass is another major transportation route for aircraft to the States, flying diagonally across the proposal. The area is dominated by three major volcanoes, Mount Spur to the north, Mount Redoubt, and Mount Iliamna. All of these mountains exceed 10,000 feet in height. The focal point is Lake Clark, itself, which is 50 miles in length. The area is characterized by steep granite peaks and spires, thousands—and I use that word, but there are hundreds to thousands of hanging glaciers, deep glacial valleys, waterfalls cascading down the granite peaks, many of them hundreds of feet in height. West of the Chignik Mountains is a series of east/west oriented lakes, starting in the south with Lachbuna Lake, Twin Lakes, Turquoise, Telaquana and Two Lakes. These are turquoise lakes which are nestled up against the mountains, themselves, and the mountains appear to drop into the lakes, making the scenic values, as Dick Stenmark has said, superb. East of the Chignik Mountains, there are two other lakes which are really of interest to this area since they provide access to float planes. Hickerson Lake, which is almost underneath the volcano, Mount Iliamna, and Crescent Lake to the north, which is also nestled against a volcano. There are two major bays on the coast, Chinitna Bay and Tuxedni Bay, which have all sorts of bird colonies and wildlife resources. The area has three wild and scenic rivers proposed for it, the Tlikakila, which runs from the Summit Lake at Lake Clark Pass, down to Lake Clark, itself. The Mulchatna River, 217 miles long, which runs along the western portion of the proposal, and the Chilikadrotna River, 60 miles in length. We are currently planning to study three additional rivers in this area this summer, the Stony River, and the Telaquana River.

Mr. HARVEY. Thank you. Jack.

Mr. HESSION. Mr. Gordon of the Alaska Coalition would like to discuss the scenic values.

Mr. GORDON. Some of this may be a repeat of what Roy said, but basically this park or this proposal area is analogous in southern Alaska to the Arctic Wildlife Range in northern Alaska, in that those two regions, more than any other place in the State of Alaska, comprise a combination of landscape and vegetation types within a reasonably compact area. More so, as I say, than any other two places—any other places in the State of Alaska. That is a good deal of the area's significance. The three primary landscape characters of Lake Clark, as has been mentioned, are the coastal zone, the Chignik Mountains, and the foothills region, and the fourth zone, which is not part of this proposal, is immediately adjacent to it, the Bristol Bay lowlands over here. On the map on the other wall, the ecosystems map, where I've outlined the regional landscape character types, the Alaska Peninsula/Aleutian Range character type extends as a finger like that. This is—I'm not talking now in terms of strictly physiography, I'm talking in terms of visual appearance. There are three reasons for this. First of all, the dominant visual character of this portion of the coast is the volcanoes, which rise very symmetrically, considerably above the other mountains.

The second character is the coastal rock outcrops which are tilted, they're called hogbacks. They're steep on one side, gentle on the other side, which are sedimentary layered rocks, rather brightly colored and a very spectacular feature of the coast. The third aspect tying into the Aleutian region is the vegetation, which is dominated by high brush, although there are actually patches in here of coastal forest, predominantly high brush. The general appearance, therefore, is much more like the country to the south than the country to the north or the country inland. This particular area differs from any other place in Alaska and it is similar to the North Cascade region in Washington State, in that you have a combination of by Alaska standards, relatively low, but extremely ruggedly glacier-carved intrusive crystalline mountain peaks, which are extruded, which are overcapped by these volcanoes. The combination of the intrusive, heavily glacier-carved, sharp spires, plus the massive symmetrical volcanoes is a landscape feature which only occurs together in those two places in North America, so far as I know.

Now, the wilderness character of this particular region, which roughly I'm outlining, is the largest area of wilderness character in any one place in the southern half of the State of Alaska, if you exclude the massive ice field. It's the largest usable wilderness area, by some margin, in the southern half of the State. That is a significant resource, even though the park proposal only covers a small part of it.

The particular elements in the landscape that are most noteworthy are the bays with the rock outcrops I've already mentioned along the coast. One of them is called the Tilted Hills and this gives you an idea, rising gently on the interior side, dropped precipitously with strikingly banded, orange rock layers, right into the Cook Inlet. The second character which is particularly noteworthy in this area is the lakes. I think if there's one thing that characterizes this part of Alaska it's the mountain lakes. They are quite different in character than Wood River—Tikchik's, but all I'll say for now is that what all of you in this room envision as a classic mountain lake, this is the area of the State which most exemplifies it. The extreme, in terms of rugged austerity, is Chakachamna Lake, which for some idiotic reason the park boundary cuts right across the middle of. Chakachamna Lake is comprised for the most part of extremely precipitous intrusive rocks, cliffs, and peaks that rise directly out of the lake. It's like some of the large lakes in Switzerland, although I've never been in Switzerland. The lake has one practical feature, which is of note. The parks service proposes a recreational use on the Kenibuna Lake over here, which is entirely in the park. It's an extremely pleasant, friendly, attractive sort of place. It has one problem. It is very shallow. You can safely land a float plane in there. You cannot safely take off in a float plane. You can take off in a float plane, however, or I wouldn't be here.

Chakachamna Lake is deep. It's not a particularly comforting sort of a place to be in a storm, but there is deep water. You can land a plane there and it has a sandy beach section here, which is quite usable for recreational purposes. The character of most of the lakes is rather similar, perhaps—and this is a personal judgement, perhaps, but one of the most striking lakes on the interior side of the park is Kontrashibuna Lake, which has a series of beaches. I'll use this as a classic example of these lakes. It has a series of beaches on the lower portion of the lake, a very large waterfall shortly below the outlet. The upper two-thirds of the lake is of fjord-like character and the visual character is made particularly striking by the fact that near the head of the lake, there are cliffs on both sides of the lake which sort of focus the view and then behind the cliffs, looking straight up, the valley actually curves off, but the view, as you see it, looks up toward the high peaks of the Chignik Mountains, with these cliffs framing the backgrounds and the lakes leading the eye up to it. This lake also has a caznicrete copper deposit and I simply comment that this is one of the handful of places in the State, like Mirror Harbor, where it would be a crime to humanity to tear up that particular spot.

The major feature of this part of the Alaska Range which separates it from other parts is that you have low passes going between the high peaks. The Necon's Two Lakes—well, the Necon's Chilligan Divide up here, Merrill Pass, which is probably the best known, Lake Clark Pass, the pass above Telaquana Lake isn't quite as easy to travel but it also is a relatively low pass. There is no place in Alaska where you have this combination of very ruggedly dissected mountains and low traverseable passes such as this. The feature that I want to perhaps point out the most for you, however, is the Foothills Zone. This is an area comprising a rather large area at the base of the mountains, which is forested—a combination of forest and muskeg, marshy ponds on the flats, a series of rivers which are exceptionally outstanding recreationally, because they have an even gradient, but sufficiently steep to provide considerable rapids challenge and low—the vegetation is close enough to the Bristol Bay area so that the timberline is very low. Even though these hills are only 1,500 to 2,000 feet high, the lower part is open forest, tends to be birch, sprucewoods, which lead you to open, dry tundra on the tops of these hills.

When you have hills close to the river, you have the combination of the river float trip, and with a great deal of ease, accessibility to these low hills, and I want to bring up a concept here. It is not on the scenic complex map here. It is on one of the work maps we have used to prepare that scenic complex map. And that is that in terms of human experience, there is a very significant visual relationship between what you can see from a usable, accessible viewpoint within the—shall I say, a low overlook within the gentler part of the region, and the perception of the shape and form of the layout of the primary topographic features in the region. Let me illustrate by what you can see out the window here, if you go up to the top of this building today. You are in Anchorage, you are looking across Cook Inlet at the Tordillo Mountains. Nobody is proposing Anchorage as a national park, although some day it may be a historical park, of how not to plan a community, but there are two examples I know of, and probably others I don't know of, in the State that illustrate the feeling that the visitor has from any reasonably sufficient viewpoint within it, that you are in a very large enclosed basin. In this case, the basin is not as obvious on the map as it is on the ground, but it does exist and that is the range of hills which roughly runs like that, which I am circling.

From inside that range of hills, you travel on the Mulchatna or the Chilikadrotna River down through these valleys where the hills are close to the river and where you can climb up on them with—in the evening after supper, it's a very comfortable, easy sort of access. You see a number of concordant hills, all of about the same elevation. Most of them tend to be along the rim. There are scattered hills, just enough to add diversity to the foreground throughout this basin, but they do not block the overall view. The feeling you get, and it's a very strong feeling, especially from the rim here, is of being surrounded by low tundra hills, but a rim of them, and as background, the high peaks of the Chignik Mountains. That feeling can be duplicated in the Kobuk Dunes area. There are probably other areas where it can also be duplicated that I'm not familiar with. It is a very, very striking feeling. That, I think, basically outlines the visual resources.

Mr. HARVEY. Thank you. Does anyone else have any comments on this? Yes?

Mr. DAPKUS. Mr. Chairman, Dave Dapkus, Heritage Conservation and Recreational Service. I'd like to talk about three rivers that are basic resources of the area, from a use standpoint. The first river that I'd like to talk about is the Tlikakila, which runs from the center of Lake Clark Pass down into what's known as Little Lake Clark, which is really the upper end of Lake Clark. The thing I think you want to remember most of all about this Tlikakila is that it's the only glacial river, at least that we proposed, in the whole western half of Alaska that would be added to the system. It's a short river, 50 miles long.

Tied in with the glacial rivers, it's one of the few glacial rivers that I've been on that you can take your family on in a raft with relative ease. Two of its big values, the first is recreation, as I already mentioned, the floating with the family. It's fast, it's fun. Along with that, in the upper end at least, you can—you have good hiking. It's alpine tundra country and you hike up to the glaciers and there are a good many of them up there.

A value that ties in with that floating of the river is, of course, the scenery which the other gentleman has talked about. I think probably that floating this river is the best way to see the scenery of Lake Clark, because you are in a narrow river valley and you can see these glaciers and the cirques and the waterfalls from anywhere in the river, up to the full length of it.

Now, I'd like to go to two other rivers that we've already mentioned. One, the Chilikadrotna, which is on the western side of the Lake Clark proposal. There again, scenery is one of its main values, as looking back at the Chignik Mountains is a constant thing from the river. Recreation is probably its biggest value again. It's one of the better floating rivers for the experienced canoeist or kayakist or a little less experienced rafter. The upper half is all class 2 white water, which makes it a lot of fun, very rocky and very fast. It is also a very clear river. The rest of its is class 1 and a lot easier. Other parts of the recreational value would be the hiking in the upper end, around Twin Lakes and then along with the bridges that were already mentioned. Its wildlife is interesting, in that the Mulchatna caribou herd lives there. Their calving grounds cross the Chilikadrotna and the Mulchatna, and also it's quite an area for moose.

From that, I'd slip into the Mulchatna, which runs somewhat parallel to the Chilikadrotna and the Chilikadrotna is a tributary of the Mulchatna. With Mulchatna, there again, wildlife is one of its biggest values, with the caribou herd and the moose. Both rivers there are excellent fishing rivers. The Mulchatna is also a very good river for viewing birds, particularly raptors and it is more of a recreational family float. It's class 1 water all the way, very easy, and also it is excellent all along it, but particularly in the headwaters.

Mr. HARVEY. Thank you. Any other comments?

Mr. Contor. Mr. Chairman, Roger Contor, National Park Service. At this time, rather than piecemeal you with a lot of listings of studies, I'd like to enter for the record, all of the studies of the National Parks System proposals. This would be a list of 176 completed studies that have taken place in the last 8 years, a list of 61 research projects that are now underway, a selected list of abstracts of these studies, and an abstract of the 8 mineral appraisals that Mr. Jones mentioned yesterday, of the 8 mineralized areas that are under consideration for addition to the National Parks System. These total, for the record, prior to ANCSA, approximately 100 man-years of study, and following ANCSA, between 1971 and now, approximately 300 man-years of study.

Mr. Harvey. Thank you very much. Any other comments? All right. Let's move on to the wildlife values in the area and the current use of the wildlife for sport hunting, subsistence, and/or commercial use.

Wildlife and Fish Resources and Uses

Mr. Hansen. Looking at this area from a statewide standpoint for wildlife habitat, the State resource assessment would place about two-thirds of the 4.5 million acre area within the Andrus proposal boundaries, in the upper half of the State's wildlife habitat potential, and about 319,000 of those acres are in the third 10 percentile for wildlife habitat. So the wildlife habitat is moderate to good habitat.

Mr. Harvey. Any other comments?

Mr. Ferrill. Jim Ferrill, Alaska Department of Fish and Game. As was mentioned earlier, the area under consideration has a very diverse wildlife population. Present within it are moose, black bear, brown bear, sheep, caribou, as well as numerous fur bearers, wolves, wolverines, and so forth. The past use of the area has been primarily by local residents for their own use primarily meat animals, but in recent years, recreation hunting has become more and more important. Part of the reason why this has occurred is because of the areas proximity to the more settled areas of Anchorage and the Kenai Peninsula. Guiding has also expanded into the area in the last 10 years, and there are several established guide operations working in the area. The local residents who utilize the area come primarily from the Lake Clark area, south, some of the Lake Iliamna villages and particularly from some of the villages of the Nushagak. In the wintertime, they utilize snowmachines to travel up into the area and hunt most of the big game species that are there, sometimes in rather heavy concentrations.

The Mulchatna caribou herd is probably the most striking single, big game population of the area. It ranges through the area, down into the Lake Iliamna country and over to the Stony River. The primary calving grounds of the population are in the Bonanza Hills area, which is within the preserve portion of the proposal. The sheep population is right at the western edge of its range, that would be the Alaska Range. There seems to be marginal sheep habitat in that during the series of winters of favorable weather, they advanced, occasionally coming as far down as some of the hillside in the Lake Iliamna area and then when adverse weather conditions hit, there seemed to be a retreat of the population back away from the area. Hunting on sheep is almost entirely sport hunting and has not produced a large number of animals. It is a very difficult hunt. Brown bear are one of the primary species hunted in the area. There are two basic hunting zones. One is the coastal zone along Cook Inlet. The hunting in this area is good because of the close salmon streams and the grass spots in the spring. Then there is an interior hunting zone, which in recent years has become more and more important as an area producing brown bear. At the same time, many of the recreational hunters are also taking black bear. Trapping within the area is almost entirely commercial, in that very little of the fur is going into the domestic use, most of it being turned for monetary returns. Of interest is the fact that some of the highest wolf harvest in the entire Alaska Peninsula and Bristol Bay area occurs in and just adjacent to these particular park boundaries. It seems to have a particularly high wolf population. Transportation for hunting in the area is primarily by snowmachine in the winter, although light aircraft is also important. The lake systems and rivers are also very important for boat access and transportation. These are primarily motorized boats, with some of the villages on the Nushagak extending a considerable distance up the Mulchatna River in pursuit of game.

Mr. HARVEY. Any other comments?

Mr. SANDBORN. Mr. Chairman, Roy Sandborn, National Parks Service. We've made an analysis of the harvest of wildlife within the Park proposal and found that sheep represent less than 2 percent of the State's harvest of sheep. The kill of moose is 4 percent of the State harvest. Black bear is 4 percent, and caribou is 3 percent. Our figures bear out what Mr. Ferrill has said, that the hunting in the western portion of the area has steadily increased by mostly flyin hunters. For example, in the 1971–72 season, there were four sheep reported fallen there by the State harvest ticket and in 1975 through 1976, there were 17, which is showing quite an increase.

Mr. HESSION. In your reference to the western portion, you're referring to the part in the Carter administration proposal that would be in the preserve?

Mr. SANDBORN. Yes. The brown bear harvest has stayed pretty consistent over the years and the moose harvest has increased from 82 animals in 1971–72 season to about 164 animals in 1975–76 season.

Mr. HESSION. Jack Hession of the Alaska Coalition. In addition to the fine description provided by Mr. Dapkus of the rivers in the area, they're also noted for their wildlife viewing opportunities. For example, the Chulitna River, which is in the Lake Clark watershed, is a high concentration area for waterfowl. Chulitna Bay is a staging area for whistling swans in the spring, waiting for the lakes and ponds to the west to open up, and I once counted approximately 30 whistler on the Nikabuna Lake. The river nearby is called Swan River, but I'd also like to mention that perhaps the distinguishing characteristic of the rivers of the area is their swiftness, which hasn't been mentioned. Because these high lakes tend to get a nice even flow and good recreational waters, and the—I'd say the best example of that is the Newhalen River, which in my opinion is one of the finest white water streams in Alaska. Mr. Gordon would like to mention the Mulchatna and Chilikadrutna system as another example of a wildlife river.

Mr. GORDON. First, one brief addition to the river discussion. The rivers do flow out of glaciated country, but because most of them are lake headed, they are also clear. In terms of wildlife, three things. First of all, the area is a very important migration route for whistling swans in large numbers, particularly along the western edge of the mountains and up Lake Clark and through the major passes, again, another function of these very low passes. Second, in terms of the opportunity to watch wildlife, the area surrounding the outlet of Telaquana Lake and the rather flat-topped tundra hills, usually to the north and the south, are an outstanding area for people to see moose and caribou in late summer, early fall. The moose concentrate in the willows along the river bottom and it seems to be a favored area, at least at that time of the year. The caribou generally, although they're unpredictable, migrate along the hills that I've described, across the river at the—in the vicinity of the outlet, and it's quite an outstanding viewing opportunity.

The Mulchatna River system has an outstanding raptor population and one of the notable species is the osprey. Maybe Jim could comment further on osprey. In my experience, there are only two places in Alaska that I know of where the osprey occurs with any degree of abundance. One of them is the Tetlin Marshes, we'll talk about later, and the other seems to be the foothill portion, possibly the lowland portions of some of the more rich fish rivers that flow into Bristol Bay. Along the Alagnak, adjacent to Katmai, we didn't mention that. Ospreys are quite common and along the Mulchatna, they are quite common. This is a species that has become increasingly rare. It's endangered in the Lower Forty-Eight. It has disappeared, in my experience, pretty well in southeastern Alaska, so these populations are of critical importance.

Mr. HARVEY. Thank you. Anything else on this?

Mr. HANSEN. Dave Hansen, State of Alaska. A point of information, I mentioned that in the State's ratings there were 319,000 acres of the area that were rated in the third 10 percentile for wildlife. The majority of this 274,000 acres, are located in the administration's preserve area. So your best wildlife habitat in the area has been included in the preserve, which is perhaps appropriate.

Mr. HARVEY. Anything else on wildlife, fish?

Mr. HECKERT. Larry Heckert with Fish and Game. Much of the area is so steep that water won't stand still and, therefore, is of little value to fishing, but some of it is of very high value and again it's along with the Lake Clark area and the Foothill Regions that have been so well described on around. The use from the recreational and fishing standpoint is very much like Jim suggested for game. There are a number of lodges located on Lake Clark that cater to recreational fishermen during the majority of the ice free months. There are a number of commercial operations that are guided lodge operations in the nearby community of Iliamna that take fishermen into these areas. Local air taxi operators transport people into these selected areas for fishing. Probably some of the most significant use, however, occurs from both commercial air taxi operators taking people from the Anchorage area over the pass into the Lake Clark area and immediate surrounding region and a lot of personal aircraft, very significant. Really this area of the Bristol Bay reflects the Cook Inlet angler's first opportunity to fly over the pass and into a closed fishing area in a very aesthetic wilderness setting.

The area is quite diverse from the water standpoint. There's excellent lake fishing, excellent stream fishing, excellent potential for boat fishing. The diversity of fish is equally as good. The Lake Clark area is not—although it's the headwaters of the Kvichak system, known for its rainbow, but it does have good populations of lake trout, Arctic grayling, Arctic char, northern pike and as areas further out are fished from this hub area, then king salmon in the Mulchatna Drainage are sought. It's what we consider a very valuable area. The use is increasing in it. It's probably light to moderate now. It has a potential for further use from a recreational standpoint, because there is such a diversity of areas and species which certainly is desirable from a sport fishing standpoint.

From a commerical standpoint, of course, I think it's fairly obvious that the Lake Clark area is a substantial contributor to the sockeye fisheries and the Kuichak systems. It has a very high commerical use. Traditionally, there is a dependence on sockeye salmon for subsistence in this same Lake Clark area. Just to hop over to the other side for a moment, I'd like to mention the Polly Creek area. I believe that included in this boundary is a beach that has high recreational use for razor clam digging. It's a certified commerical beach, I believe. It's a very popular area, with the Anchorage razor clam digger, as such. In that area and in all these areas, as we've stated before, they're dependent almost entirely upon the continued use of light aircraft for transportation and/or motorized watercraft. That's all I have.

Mr. SANDBORN. Roy Sandborn with the National Parks Service. I might just comment on the number of aircraft, so you can get a feeling for it. In the counts that we made while floating the Tlikakila River, for example, the aircraft through Lake Clark Pass are averaging forty a day of light personal airplanes, and I'm sure that Merrill Pass would be that much or more.

Mr. HARVEY. Any other comments on the fish and wildlife? Anything on subsistence use, any additions on that? All right. Let's move on to the renewable resource area, timber, agriculture, grazing. Go ahead, Dave.

Renewable Resources

Mr. HANSEN. In the State's assessment for the Andrus proposal area, we show that of the 4.5 million acres in the area, only 27,000 acres have any agriculture potential and that's in the seventh 10 percentile, with nothing in the top half.

If you turn to the Udall proposal, which includes 9.3 million acres, we find that there's still only about 397,000 acres that have any agriculture potential, even when you extend it to the larger acreage of Udall.

Mr. HARVEY. Would that addition be in the western area?

Mr. HANSEN. That would be in the western area.

Mr. HARVEY. Thank you.

Mr. HANSEN. Generally, as a point of information, as you expand to the west you get into richer settlements and productivity lands for all multiple uses. These are State lands that we'll get to later. 166,000 in the Udall proposal are in the top half, but they're in the fouth and fifth percentile. But basically, in the Andrus proposal, there's very little agricultural land and it isn't in the top half. Going back to the Andrus proposal on forestry, nothing is rated in the top half of the State for forestry potential, though 1.9 million acres of the 4.5 million acre proposal have been identified as having some potential. In Udall, there is only a 26,000 acres in the top half, which is very small for a 9 million acre proposal. There is 4.7 million acres of the 9 million acre proposal that have some potential, again emphasizing that, going further west, you get into the richer land.

Mr. GALEA. John Galea, Forest Service. There has really not been any intensive forest surveys made of the area, with the exception of three units. One located at Polly Creek, the other at Red Glacier, and the other at Tuxedni. Within these three units, there has been roughly 30,000 acres of commerical forest land identified that compare with the quality standards that are found in the coastal forests. The standing volume in these three units is approximately 74 million cubic feet. As I stated, there is about ninety percent of this area that really hasn't been inventoried enough to really determine what the forest resource is.

Mr. HARVEY. OK. Thank you. Any other comments on this area, timber or agriculture? All right. Let's move on to the non-Federal lands situation, State and Native selections, private land. Dave, do you want to start off?

State and Native Land Selections

Mr. HANSEN. OK. If you're looking at the Andrus proposal area, the State currently owns 1,045,000 acres in the proposal area. It's primarily on the west side. If you look at the map on the wall over here the red on the west is all State land. The orange down below is what the State is interested in selecting. But from the Bonanza Hills on west in the Andrus proposal is State land. Thank you.

Mr. HARVEY. Thank you.

Mr. HANSEN. The State is interested in selecting in the Andrus proposal, about 41,000 acres and that would be right along the southwest, what's in orange there on the southwest side of the proposal area.

Mr. SILVER How much was that again?

Mr. HANSEN. 41,000 that we're interested in the Andrus proposal area.

Mr. SILVER. There's not that much.

Mr. HANSEN. If you move to the Udall boundary lines of 9.3 million acres, the State owns 4.6 million acres of it, so in other words, when you increase the Udall boundary, increase it by 5 million acres of park size, 3½ million is State land. The Native inholdings or the present Native selections amount to about 837,000 acres in the Andrus proposal area. It's estimated that they would retain at least 400,000 to 480,000 of those acres. In the Udall proposal, the Natives have selected 2.1 million acres, and I don't have an estimate on retention in that proposal area.

Mr. SILVER. I have a question. Is there anybody here that can speak to the question of Port Alsworth? It's this part of the Cook Inlet land that the State—Bristol Bay—came in to see us about. It might be good to talk about that for a second.

Mr. BISHOP. My name is Bill Bishop of the Bristol Bay Native Corp. I'm not sure I caught your question, other than Port Alsworth.

Mr. SILVER. Well, my question is, somebody from Bristol Bay came into our office in reference to a selection problem within the park related to a group—a Native group under the—Port Alsworth. So without getting into any great detail, it might be good to have that summarized for the record.

Mr. BISHOP. Well, there are numerous problems there. It is a Native group, a small group, registered to the Bristol Bay region. However, it's located in the township where Port Alsworth is located. It's just outside of our existing boundaries, the Cook Inlet region, and someday I suppose that will be worked out, if necessary. They have selected whatever land they're entitled to and I don't recall right now, but it was a fairly small amount. It seems to me it was four or five sections, and the region supposed they would get the subsurface. Does that answer your question? That's about the best I can do.

Mr. SILVER. OK. Thank you.

Mr. HARVEY. Are there any other comments?

Mr. SANDBORN. Mr. Chairman, Roy Sandborn of the National Park Service. I just might add that the Cook Inlet Corp. has pretty much firmed up their selections as part of the Cook Inlet Exchange.

Mr. HARVEY. Thank you. All right. Let's move on to energy values in the area, oil, gas, uranium, et cetera.

Energy Resources

Mr. HARTLAND. I'm Don Hartland, with the Alaska Oil and Gas Association. Along the western portions of Cook Inlet, which are a narrow strip between the interior bay and area 20, that's the same approximately 300,000 acres that's in the park boundary, that consists of the upper half of the Cook Inlet sedimentary basin which, up to last year, has supplied the State with about 100 percent of its oil and gas production.

This area has had some oil exploration. We would prefer to have geological access to it. There are about 90,000 acres of (d)(2) lands involved. As Mr. Gordon pointed out, this is a series of upturned sedimentary beds, forming a considerable range of uplands and there are oil and gas seeps and several wells have been drilled for oil and gas between 1902 and 1961. We would like to have access to this area for geological exploration for continued investigation of oil and gas potential of the Cook Inlet Basin.

Mr. HANSEN. If I followed your comments correctly, you're stating that the offshore area is the area being developed currently and where the current value is. The onshore area, however, you're looking at from an access and an exploration or a continuing geological investigation standpoint in the future, is that correct?

Mr. HARTLAND. That would be our primary purpose.

Mr. HANSEN. Thank you.

Mr. HARTLAND. Within the Parks Reserve boundary further north, it takes in somewhat more of the Cook Inlet Basin and we feel that there is some oil and gas potential there. In other words, it could be attractive for drilling prospects at some time in the future. But within the Parks boundary, our main concern is with geological access.

Mr. HARVEY. Any other comments?

Mr. HANSEN. I ask this question just to clarify, because the State assessment would definitely support the kind of statements you've made. Within the Parks boundaries, either Udall or Andrus, we don't find anything of significance as far as oil and gas potential.

Mr. HARVEY. Any other comments on the energy? Go ahead.

Mr. FANKHAUSER. Bob Fankhauser, Alaska Miner's Association. I would just mention here that there are possibilities for uranium, but I'll save my comments for the discussion of hard rock potential.

Mr. HARVEY. OK. Any more comments on energy-related potentials?

Mr. HANSEN. There is a small amount of acreage that has some coal potential, but this is in the 10th percentile of the State's rating system. For uranium, we're also talking about 116,000 acres, rated in the third level of the State's one through five rating system.

Mr. HARVEY. Any more on energy? All right, we'll go to the hard rock area.

Nonfuel Mineral Resources

Mr. FANKHAUSER. I think I'll reserve comments for a little bit. I think that some others have more general information on this. I have been on the ground out there and I have quite a bit to contribute from just personal knowledge.

Mr. HARVEY. All right, we'll let USGS start.

Mr. SINGER. Don Singer, of the U.S. Geological Survey. First, in answer to your question the other day, we currently have a level three study going on in the Lake Clark quadrangle area. There are four areas that we have delineated that are within this region and are favorable to a variety of mineral deposit types. Two of those areas were discussed yesterday and I'd prefer not to take all the time to repeat everything that was said yesterday in those areas. These are areas six and seven on the level II map. They have potential for porphyry copper, porphyry molybdenum and copper skarn. The two additional areas that were not discussed yesterday, I will mention briefly.

Part of our area 5, which I believe you can find it—well, you won't be able to see it from your seat, but it's on the map on the wall there. This is in the northern part of the Lake Clark area and it has potential for porphyry copper deposits. We have estimated there is a 90 percent chance that there are at least five porphyry copper deposits in this area, a 50 percent chance that there are nine or more deposits and a 10 percent chance of 15 or more deposits. Now, area 5 is only partly within the Lake Clark area. There's also potential for porphyry molybdenum. We've estimated there's a 90 percent chance of 3 or more deposits in area 5, a 50 percent chance of 6 or more deposits, and a 10 percent chance of 10 or more deposits. There is also the possibility of fructifites which contain, in this case, silver and copper and some gold and leaded zinc, and there are two suspected felsic volcanogenic deposits, which would contain copper, lead and zinc. The area is favorable for additional discoveries of this particular type within area 5.

The second area I should mention with respect to Lake Clark is what we call area 29, which is on the eastern portion of Lake Clark and it contains known iron-rich skarn deposits, a variety of them, and it also has the possibility of other finds in the future. I think I will stop at this point.

Mr. HARVEY. Fine. Anyone else?

Mr. LAMBETH. Bob Lambeth, U.S. Bureau of Mines. I want to give you an idea where some of geological occurences are that he was talking about. In the northern area, here, are the Tertiary/Cretaceous intrusives, which are highly favorable for porphyry copper, and porphyry molybdenum. In this area in particularly, there were several definite porphyry molybdenum and porphyry copper samples, found. Along the borders there are contact type deposits of copper, lead, and zinc. There is a prospect called the Chilligan group, which I believe has been diamond drilled. I'm not certain of that. Coming down through this area is a continuation of the Tertiary/Cretaceous intrusives. All the way through there during our field survey last summer, we found signs of molybdenum and some associated tungsten. Here, you would expect deposits similar to the Climax molybdenum deposit in central Colorado. Over in this area is another Tertairy intrusive. It had not been extensively investigated. We went in this summer and did geochemical sampling at this location. We found extremely anomalous tin. This is of interest because the North American continent lacks tin producers.

Through here, is an old volcanic sediment belt, favorable for volcanogenic massive sulfides and stock work type deposits. The best example of a similar geologic environment, are the Jurassic volcanics in British Columbia. The same island arc type of environment, of the same age, with the same types of rocks are found in the present producers at Brittania Beach and Gran Duc. In this part of the Lake Clark area, is a slightly older intrusive. There is less chance of finding valuable minerals here, however, there is copper in this area. Also in the middle of the proposal area is a roof pendant of basic volcanic rock and some volcanogenic copper here. Farther to the south, are even older rocks which have not been investigated extensively, because it is thought there is less chance of finding valuable minerals. Along here are more volcanogenic rocks. There is volcanogenic copper here at the entrance to the pass, highly anomalous copper here, volcanogenic copper here on Double Glacier. There are contact iron deposits in the Tuxedni Bay area, and there are other contact deposits along here, copper and iron.

This is an area, we are not familiar with. The State geologists were in there and should have information. Several windows of the older volcanogenic rocks crop out in here. There is a possibility of volcanogenic deposits at a shallow depth. There are also several tertiary instrusives through the area, which are known to be mineralized. The Bonanza Hills gold is almost certainly related to one of these. There is geothermal potential Mount Spur, Redoubt, Illiamna and Augustine are active volcanos. Steam and hot water were intersected in oil exploration wells drilled on the Iniskin Peninsula. The coal that was mentioned earlier probably occurs here. Coal float has been found along the stream, but not much is known about it and we have been unable to find the outcrop. Industrial minerals, include pumice in this location, zeolites down in the Chulitna Bay area, and cement quality limestone here.

Mr. HANSEN. Point of clarification, Mr. Chairman. Are we following that map correctly, are these areas outside the park boundaries?

Mr. HARVEY. The blue lines, the smallest lines in the park, is an extension on the west of the reserve and the outer line is the area of environmental concern. This is all in terms of the Andrus proposal.

Mr. JONES. David Jones of the National Park Service. I think it would be helpful to the Committee and to all the members here in the room if the USGS and the Bureau of Mines would define for us their use of the word, deposit. What does it mean?

Mr. SINGER. I'm Don Singer of the USGS. I think you are probably well aware that you cannot find any good definition for it anywhere in the literature. What we have done is simply rely on other economic geologists with a great many years of experience with the way they've used the term, and I cannot define it. I don't think anybody can.

Mr. LAMBETH. For the record, we do have a definition of sorts. Rather than use "deposits" in the written description that we turn in, we will use the terms, occurrence and prospect. An occurrence is exactly what it says, there is mineralization there, but how much is not known. If during further investigations, more extensive mineralization is discovered, it goes into the prospect status, which is, one more rung up the ladder.

Mr. HARVEY. So as I understand it, neither of these terms or any of these definitions would imply an economic judgment about whether one could recover that mineral at a profit?

Mr. LAMBETH. A prospect, means that in the judgment of the people who evaluated it, it has a definite significant economic potential.

Mr. HARVEY. Let me ask you a question then. Given the fact, that the value of copper has gone up 6, 7, 8 percent in the last couple of years and the price has gone down. What does that do for those kinds of judgments, or are you making an assumption about what copper might bring 20 years from now or 10 years or what?

Mr. LAMBETH. We have to make a lot of broad judgments of that sort. When you start looking for an economic deposit, you begin at the bottom with geochemical exploration, outline anomalous areas, and then move into the anomalous areas, and evaluate them. They are either thrown out or defined farther. The process takes several years before you actually approach the mining stage. Whether it's economic or not depends not only on the price of copper, but how much is there, how concentrated it is and if it isn't just copper, what are the accessory minerals? Also, are there penalizing elements that would cause problems in smelting, which increases expense.

Mr. FANKHAUSER. I'm Bob Fankhauser with the Alaska Miner's Association. Mr. Chairman, I was continuing on that discussion brought up, I believe, by the Park Service on the definition of deposit, occurrence, and this sort of thing. As mentioned, there is really no set definition in terms of grade and tonnage. Significant in other people's presentations and some of the things that I hope to bring out here is that this area of Lake Clark is a very underexplored area of Alaska. There are very few mineral claims out there, which I think is probably what the Park Service is alluding to. There are not that many recorded claims. Bonanza Hills, of course, has claims that were staked in the early days, for gold, and as someone else mentioned, the Kasna Creek copper deposit has valid claims there, just south of Lake Kontrashibuna and there are some other claims around the Tuxedni Bay area. However, this whole number of claims is fairly small. The thing I hope to bring out in my testimony here is based on my experience of two field seasons with a helicopter supported crew in much of the boundary areas of the Merrill Pass area, Chakachamna area, and around particularly the Lake Clark area and Tuxedni Bay area. Most of Tordrillo Mountains up there, I've worked in and although I can't submit it as testimony, the report I have here is about 6 inches thick and was prepared as a conclusion of the results of this field experience and the real thing I'd like to bring out here is that, while there aren't very many claims located out there, in the work that we did, we outlined 23 major occurrences and some 50 significant anomalous areas that deserve further work. These are mainly for copper, lead, zinc, silver, and in some cases, gold and uranium.

Now, when I say occurrences, again, there are no grades and tonnages on these, because this is a very preliminary or first step evaluation of this land area. I think it's highly significant that in those two field seasons we were able to go in without benefit or prior claims, which as far as in exploration is one of the first places that one goes to see what's there in the country. There weren't that many claims out there and on the basis of the geology, we were able to come up with numerous inferences and by following the geology, as outlined by Bob Lambath there, the most favorable portions are the older schists belts around the Lake Clark area.

Just briefly, I'll point out these more favorable geologic areas and then a few specific occurrences. I won't go into detail, because, like I say, there are literally hundreds of these things that are not tabulated by stream sediments and rock geochemistry. The Lake Clark area here is an area of older rocks, chlorite, biotite schists that's favorable for volcanogenic deposits. Likewise, on this side of the batholith, volcanic terrain of the Jurassic volcanic terrain has significant copper potential and we have outlined in the area of Upper Tuxedni Bay here a volcanogenic deposit that has 10 to 30 percent barite, it has a couple of percent lead, 1 to 3 percent zinc and several parts per million of gold. Now, this is only one that happened to be exposed in a small cut. We have several other anomalous zones of mineralization in the same type of geology, these older Jurassic volcanics on this side of the belt. There's copper float off of three sides of Iliamna Volcano, mainly in—again, the host rock being volcanic antisites, basites, and so forth.

Kasna Creek, as you know, is the major recorded occurrence and has been diamond drilled and as far as I know, is still a valid holding in that area, unless it's been bought out or something. But this is reported to have three-quarters of a billion dollars worth of copper and iron and that's in this volcanic belt on this side of the batholith. Additionally, we've defined other occurrences of similar types in the volcanoes of Little Lake Clark, Upper Little Lake Clark, and as far north as just east of Twin Lakes, and by these occurrences, again, this is in the order of, if I remember right, 1 to 3 percent zinc and several percent copper in here.

Moving just to the west, we get into a different geological terrain. These are mainly cretaceous sediments, but intruded by several outlying stocks and pipes of—as offshoots of the main batholith through here and in these areas around here, as someone mentioned, there is potential for breccia pipe-type deposits and we have defined two of those and I won't go into too much detail on those, but again a breccia pipe is a sort of a volcanic neck which is a very favorable site for mineralization, being capped and these fluids held in by the tertiary volcanic flows that you see out here. Bonanza Hills, this extension takes in all this area of Bonanza Hills, as I mentioned, there are active placer claims here and there is high stream sediment geochemistry of lead, zinc, and silver coming out of those lowlying hills.

Moving a little bit northward, in this area up here, the batholith becomes succeedingly younger in age in this direction, based on age dating by the U.S. Geological Survey and likewise, mineralization from limited work that we've done through the highly rugged terrains here indicates numerous occurrences of molybdenite and copper in a porphyry-type setting, associated with these younger tertiary intrusives of mainly monzonite and some diorite composition. Float from several of these glaciers around Telaquana Pass here contains 1 to 3 percent molybdenum and associated lead zinc in stockward quartz inlets. Not all, in fact none of those have been followed up, but let me point out the existence. Likewise, further north than the Nikolai drainage, there are numerous occurrences of particularly molybdenum associated with the younger granidiorites in this area, which have a northeasterly trend.

While not much work has been done in Alaska and particularly out here for porphyry-type uranium, these deposits associated with molybdenum and accessory minerals such as fluorite and so forth are favorable type host rocks for porphyry uranium. A little bit farther north, as Bob mentioned, the water currents right in the margin of this triangle here around Crystal Creek, that has been drilled and I believe there are some active claims on it. It may be just on this side of the line. I can't really tell from here, but this is a porphyry system with tourmaline greisen alteration on the margins, mainly copper, but at the margins of this deposit and in this general area within the sediments and volcanics, there are massive lead, zinc bodies that run several percent. The ones that we happened to find in an outcrop and in—that were in place were fairly small, 1 to 3 foot wide sort of thing, but again this is an indication of mineral potential. This new addition to the boundary over here, I don't know, but I presume this would also exclude mineral entry. Let me mention just a couple of things that I know of from personal experience. Off of Mount Talbot in this glacier area right here on the moraine there is a medial moraine several hundred feet long and 100 feet wide, of porphyry copper mineralization, which is of ore grade associated with the monzonite stocks.

That one would be very tough, of course, to find in these glaciers, but again I'm pointing out these things as potentials in the area and the fact that this whole area is underexplored in regard to exploration in Alaska in general. Also up here off the Hayes Glacier is another occurrence of porphyry copper with associated high precious metals of gold and silver, in the margins of the thing. Over here around Tremble Glacier, there are some molybdenum claims that were active up until a couple of years ago. I presume they still are. This is one of the occurrences recorded in the literature of molybdenum in veinlets, quartz veinlets coming off of the glacier. Down here by Strandline Lake, there's an intersection of major faults and again porphyry copper-type mineralization and high precious metal content in veinlets associated with those intrusives.

I think, looking at this line, that the coal areas that have—that is recorded in the literature, is just outside of this line. I can't really tell, but southeast of Beluga Lake right in here near the Capps Glacier is a 50-foot coal bed that is of commercial value. I think, just looking at it, it may be just to the east, but it would be something to keep in mind.

Also here in the Chakachamna area, down here around Blockage Glacier, Black Sand Creek, we have the northern extension of this volcanic belt, which does have massive chalcopyrite and traces of lead zinc associated with volcanics in this area. A little bit further down here, around Redoubt Creek, there's a huge porphyry system that has 1 to 3 percent fluorite, a fantastic color anomaly associated with this area, as someone else mentioned. The magnetite deposits have been known and prospected around Tuxedni Bay for some time, and those are probably noncommercial, but again I've only—in my experience, I've prospected parts of the outlying areas, mainly based on accessibility and land classification, but, and I can't really put together a computer semblance that would give you the definitions of mineral potential and the statistics, but based on my experience as a field geologist, this is really good hunting country. You have favorable rocks and the significant fact is that while these occurrences are not drilled out, nor is there tonnage and grade available, the fact that there are numerous of them that have been found in the last couple of years points to the fact that this area, given a chance, could be a major mineral district in the future. I think we have a map summarizing a few of the things that I've mentioned here, more specifics as to location and so forth, which we'll file as part of the testimony. Thank you.

Mr. HARVEY. Thank you. Any other comments here. Yes?

Mr. LAMBETH. There is one thing. It was mentioned that the area is heavily glaciated and that is true, but that does not necessarily preclude mining. In fact, there are two mines that are pretty sizable, the Black Angel Mine in Greenland and the Gran Doc Mine in British Columbia, in which the mining actually occurs under a glacier.

Mr. HARVEY. Dave.

Mr. HANSEN. Yes. Looking at it from a statewide perspective and dealing with not the area of environmental concern, but the preserve and parks boundaries, we find that of these 4.5 million acres in the area, our 1977 assessment has some mineral potential on nearly 4 million of those acres. However, none of it was rated in the top 20 percent of the State's mineral potential. Close to 100,000 acres was in the third 10 percentile, but 2 million of the 4 million acres of potential was rated in the 10 percentile for this area. One qualification on this, we are in the process of updating our assessment. It should be available within a couple of months. There has, for this particular area, been substantial new information both from our own geological survey, which has been working out in the Bonanza Hills area on the western side of the parks proposal. Also we have received a great deal of additional information from various industry sources in this area. The report at this time is, the information is mixed. Some of it will raise certain parts and some of it will lower other parts. But generally that's where we stand.

Mr. HARVEY. Thank you. Yes?

Mr. SHANE. Ben Shane, the Alaska Coalition. To say some things to try to put the minerals question in perspective, both for Lake Clark and in a larger sense, because we've been hearing quite a bit of information for the last 2½ days on listing great numbers of mineral occurrences. First I'd like to start by talking a little bit about wilderness, rather than minerals, and then to look at both the wilderness issue and the minerals issue and try and put them in some kind of balance and perspective.

We should realize that if we were sitting around this table 110 years ago, we probably would have been discussing Yellowstone National Park and we would have been discussing the potential energy values of the Yellowstone geysers and I don't think any of us today would propose capping those geysers and using them for energy values. Let's look at the map that's on the wall. What the map is, is a Land Use Planning Commission map of primitive values in Alaska. It shows two types of wilderness quality lands, high and medium. The criteria, we won't get into here. But the point I'd like to make is, what you're seeing on that map is that almost all of Alaska is included in lands of primitive value and the land that's there is the last fragment of the great American wilderness. It's all that's left of the wilderness that once covered the continent and provided the context for our society's growth and it's of importance to us as a people. If you look outside of Alaska, you'll find there is some defacto and dedicated wilderness that still exists. The areas are in order of magnitude smaller, those are the largest areas. They're found in three locations, in Idaho, western Montana, and in northwestern Wyoming, overlapping into Montana. Other wilderness areas in the Lower States are in order of magnitude, yet smaller than that. So what's on this map is virtually the entirety of the major wilderness in the United States and if you'll look at a variety of different resource values, whether it's ecological, which Rich Gordon described to you yesterday, whether it's reacreational, esthetic and so forth, these are the lands that we must turn to for that resource and that set of resources.

Now, let's look at minerals. The paper map on the back wall, the one is black and white, the second from the right, is the U.S. Geological Survey map of Level II studies showing mineralized zones in Alaska. If you super impose a map of the national interest lands, and I'm not talking now about the specific boundaries, but it's the kinds of boundaries that people have been talking about in recent months. On a map of that type or if you look to the State's computerized inventory, you find that—and you can't get too specific with these figures, but on the order of five-sixths of Alaska's mineralization is outside the proposal for parks, refuges, monuments, preserves, wilderness areas in Alaska. So what does that mean? It means that in terms of wilderness values in all of the natural or cultural resources that are associated with wilderness, we must look to Alaska and we must look to the national interest lands to retain that resource. If we look at minerals, we find that five-sixth of Alaska's minerals, or if you extrapolate it, roughly 4 percent—4 or 5 percent, again, you can't get too specific, of the Nation's mineralized zones are located on the national interest lands. So no matter how many specific occurrences you list, you're still talking about something that is of relatively small importance to national material supply.

Let me go a little bit further. The gentleman from the Alaska Miner's Association mentioned that the major recorded occurrence, and I realize that many have not yet been recorded, in the Lake Clark area was the Kasna Creek deposit, and he gave you some estimated tonnage figures. The tonnages that he gave us indicate that the Kasna Creek deposit contains about as much copper as the United States consumes in about 2½ weeks. In other words, it delays the day that we must open a deposit elsewhere or switch to subsitute materials by 2½ weeks. Yet the Kasna Creek deposit is located in what Richard Gordon yesterday described as one of the five great potential ecological wilderness reserves in Alaska. It is also located in what Richard Gordon said today is one of the key most scenic lake basins in Alaska.

Now, to take our perspective one step further, it's not just a question of percentage of overlap of the national interest lands proposals, the wilderness or with mineralized lands. Economics are also important and I think those have been inadequately discussed during the 2½ days of our discussion here. What I have to say certainly does pertain to Lake Clark and central Alaska, it also pertains to areas we've already discussed and will discuss.

Let's start out by looking at what the U.S. Bureau of Mines has done with regard to the economics of mining in Alaska. One of their reports, information circular 8656, deals with mining costs in the Lake Clark area. The circular concludes that mining costs there are approximately twice those in other States for porphyry copper, at least for the one that they modeled. It concludes that the price of copper would have to be approximately twice that for a comparable deposit in Arizona or approximately twice—more than twice the current price of copper, or higher than the projections for the price of copper past the year 2000, even taking projections which allow for an increase in the absolute price of that commodity, and those are much in question by some economists. It is no accident that Alaska has had no mining industry for more than 40 years, no mining industry of real consequence from a national perspective. The cost of mining in Alaska, if you look at the variety of the Bureau of Mines studies that have come out in the past couple of years, are 1.5 to 2.75 times the costs in other States. Now, there will be—there may well be deposits that can be mined in Alaska and they may well be big ones, and they may well be important to the individual companies or the specific local economy within Alaska. We don't deny that that's true. But Alaska minerals, for the most part, from a national perspective, cannot be mined for decades, if ever.

If they will be mined in the future, it means a major restructuring of the cost picture in Alaska and in the mining industry. It's not just something that's limited to transportation. That's something the Land Use Planning Commission economists are coming out with. You're dealing with the fundamental problem of high costs in Alaska, a fundamental problem of regional inflation and in addition, you're dealing with cost factors that are not associated with inflation, but are fundamental to the climate and the terrain of Alaska. The things that make mining not necessarily impossible, but make it much more difficult and reduce its importance from a national perspective. The major difficulty confronting mineral development in Alaska is the complex structure of total costs that place Alaska minerals at a competitive disadvantage with resources elsewhere in the Nation and in the world.

Now, I'd like to talk for a minute about the strategic and national importance of minerals in Alaska, because one might say, well, it's more expensive to mine here, the—you have to have a very high quality deposit to be able to mine, but we really need to get minerals out here, because other nations might form cartels, the national security might be upset. And I think it's important when we're discussing these resources, to address that question.

However, unlike petroleum, most nonfuel minerals are not subject to cartel action. And if you look at reports, the annual reports of the Secretary of the Interior under the Mineral Mining and Policy Act, you find that he concludes that mineral producer groups have less control of export markets, and he discusses such things as substitution possibilities, world resource distribution patterns, and the urgent need of exporting countries for continuing foreign exchange income, as among the reasons that for nonfuel minerals, now, cartels are not a threat to the United States for most minerals. But you might say, that's most minerals, and what if we find on the national interest lands—and we've heard discussions and we will be hearing discussions of such minerals as chromium and platinum. Can the Nation afford to withdraw these minerals that we're talking about from production? And I would conclude, the Nation can and can quite easily. Of the minerals found in Alaska, only chromium and platinum group metals may realistically be subject to embargoes or cartels. Most of the Nation's identified resources of these metals are located in States other than Alaska. Most Alaska resources of these metals are outside the boundaries of the national interest lands.

Costs of mining them in Alaska are very high. Most Alaska chromium deposits, for example, are very small. Even in an emergency, only a small fraction of the Nation's demand for chromium or platinum could be met from Alaska mines, particularly if you're talking about that roughly one-sixth of Alaska mineral potential that's in the national interest lands. It makes more sense to stockpile supplies of these minerals against a time of embargo, rather than rely on mines in remote and expensive Alaska, and I think that over and over, as we hear people talk about specific occurrences of these metals, we should ask ourselves again, what proportion of our total resources are we talking about? What priority is it for us, in terms of production, given the high costs of mining in Alaska? And we should weigh, always weigh these individual occurrences against that map of primitive values which is our only major wilderness area left in the United States.

I'd like to address just two more points in closing. First, when we talk about the resources that we've been mentioning in the last couple of days, are we talking about something that's of consequence to the economy of the State of Alaska? I think the answer is clear and the answer is, no. If you look at the studies done by the Institute of Social and Economic Research of the University of Alaska, if you look at the analysis by the economists of the Land Use Planning Commission, you see that Alaska is becoming wealthy. It's becoming a wealthy State on the basis of oil revenues. Revenues from oil, royalties, and taxes will create a sensational growth in the State of Alaska. This growth, according to the University of Alaska, is basically stimulated by the spending of the State royalties and taxes. It is sufficient to insure more than doubling the size of the beautiful city of Anchorage in a very short time. It is sufficient to insure adequate funding for fundamental services. Alaska simply does not need the kinds of mineral development, the economic return from mineral development that might be found on the one-sixth of the mineralized lands that are included in the various (d)(2) proposals.

A Federal/State land use planning commission study, by Dr. Bradford Tuck, concludes, "That neither the State's fiscal viability, nor more generally the State's broad economic well-being is dependent upon availability of resources on the (d)(2) lands." And let me make just one more point in closing. The present value of Alaska minerals is very low. If you summarize the National Park Service appraisals of claims within proposal areas, you find that they are on the order of $1 million for existing claims in the Wrangells or $3 million in the Denali proposal. And when we're talking about hard rock minerals, we're talking about commodities that, at least in the long term, can be substituted for one another and we don't necessarily face absolute shortages. You can treat them as commodities, as other types of commodities are treated in economic terms, and the decision to defer production of a portion, and we see a small portion in regard to this legislation, of Alaska's minerals is a decision to provide our economy with materials from alternative sources which are available, but which might be somewhat more expensive.

There will be a price for this decision. It's an economic price, it's what economists call the opportunity cost of the withdrawals we are making and the economists contracted for by the Land Use Planning Commission on resources for the future concluded that this opportunity cost in dollar value would be very small. And we must oppose that dollar value against all of the values that are associated with the wilderness map up there, natural values, recreation values, aesthetic values, scenic values. The cultural values that are associated with an attempt to preserve at least a fragment, at least a fragment of the natural environments which have always been available to our Nation and to our culture, which have been important to the growth of our culture. The American wilderness, which really has been the context for our national growth.

Mr. HARVEY. Thank you, Mr. Shane. I've let you go on here on a broad area, because I think the point you're making is a good one. Chuck, I'm prepared to give you equal time now or sometime later.

Mr. HAWLEY. OK. I think there's about five or six critical points there that need to be answered and maybe a few things that don't need answering. One of the them concerns the amount of mineral potential on national interest lands and I think the record shows pretty clearly that the dominant hard rock mineral potential is on two classes of Federal or actually it's on (d)(2) lands, (d)(1) lands and the existing Federal withdrawals, the national forest, the Arctic Wildlife Range and the Pet–4, and roughly 200 million acres of Alaska has mineral potential and that land is dominantly on the Federal domain. There's several reasons for this, one, that the State did not, until the 1971 selections, attempt to select lands for hard rock value, because the land was available under the mining law. It did not think it needed to. The other reason why it didn't is because it didn't know where it was and it's very inefficient to select land on the basis of hard rock potential. For the small amount of acres that are underlined as minerals, you get a lot of land that really isn't valuable, so I think the record does show that the—there is a real conflict, that the high mineral potential lands for geological accidents is on the national interest lands.

In regard to the cost issue, it's true that costs are higher in Alaska, but it's also true that Alaska has not been high graded and so the deposits which once existed in the Lower Forty-Eight which were high grade deposits and have been removed, are still present in Alaska. The other thing that's happened in Alaska in the last few years is that we have discovered types of deposits which were once thought not to exist here. And that is that Alaska contains strataformed deposits of copper, zinc, lead, and silver, which are high grade. The average grade of copper deposits in the Lower Forty-Eight is about 0.5 percent. The average grade of copper in the Brooks Range is 5 percent and it does go back to a matter of economics and obviously that there are—I think that you can say that a lot of deposits which would be exploited in the Lower Forty-

Eight would never be exploited in Alaska because of this high cost factor. This also gets you back to the amount of land that's underlain by minerals. Even though 200 million acres of Alaska has mineral potential, not more than 1 million acres of that, if you believe all the statistics worldwide of mineralized areas, will be proven to be underlain by minerals that are rich enough to mine, and that, of course, is the reason that the mining industry has always felt that they should have priority, because they're looking for the needle in the haystack. Now, the arguments that are—that go against this are that, granted, this is a very small area, but you bring in transportation and other things and housing, and that's true, but that's not necessarily undesirable, especially in Alaska, but we can do things differently.

For example, in the Brooks Range, it might be possible to base all of the work within Fairbanks and to rotate them in and out. There are all kinds of things that are possible in Alaska in the way of development. So I don't think that's necessarily the critical factor. On strategic and national interest and cartel action, because minerals are abundant worldwide, and they are fairly abundant, the cartel action was not too likely, but something has happened in the cartel and it's in a way that wasn't predicted. A few years ago, people were thinking that somebody might raise the price of copper so that we couldn't afford to buy it. Actually what's happening is that they're lowering the price of copper so that we can't afford to produce in this country. The replacement cost of copper in the United States is $1 a pound. They're getting 60 cents a pound for it, and it's because we've moved to good environmental laws, good smelting practices that demand a higher price, and we have high labor markets, so perhaps we're even going to have to subsidize it, but there are negative cartel actions that are hurting our mining industry that need to be recognized, as well as positive ones.

As to the fact that Alaska is becoming rich on oil, that's true. I'm not sure it's exactly desirable and, too, the mines and mining in Alaska could have a major statewide and could have a major national economic implication and I'll debate Mr. Shane at length on that one, but the studies that have been made in the Brooks Range and in southeastern Alaska show that with a fairly small number of new mines coming on, say, between now and 1990, we could have on the order of 3,000 to 4,000 of direct jobs, mining jobs related. OK. So depending on whose multipliers you believe, why, you can add on the job or you can add on the two jobs and if you're really expansive, you can add on quite a bit more, and then you have the related transportation factors, Alaska and maybe transportation is a subsidy to mining, but transportation, Alaska does need a better transportation system, and these jobs are added to the economy. We feel that mineral development is very key to Alaska and it's key to the Nation. Thank you very much.

Mr. HARVEY. Yes; that was a useful debate on this issue and I guess we can forgo it on the other areas. It seems it wouldn't change anything.

Mr. HANSEN. As I said, to try to give some basis to the general remarks on minerals in the State when you look at things statewide, as Mr. Hawley mentioned, there are 189 million acres that have been identified as having mineral potential in the State and the majority of that is federally owned, approximately 120 to 127 million acres of this potential is in Federal ownership. Depending on how you draw the lines for Native ownership right now, the State and Natives own approximately 65 to 75 million acres of this potential and the State is attempting to select an additional 23 million acres of this potential, which will put it up to Native/State, around 100 million, probably just less than 100 million, and Federal ownership right around 100 million, too, when things are completed as far as the land selections on all sides.

Breaking it down just a little bit differently, the Federal acres that I included in the 120 to 127 million acres include 27 million acres or 15 percent of the State's mineral potential in prior Federal withdrawals, being anything but (d)(2) and (d)(1) lands, 44 million acres in the (d)(2) withdrawals, which is about 24 percent of the State's potential, and 62 million acres or 33 percent of the State's potential in (d)(1) lands, under classified (d)(1) statewide. Just throwing one more perspective on this, if you look at the rating system just the way it comes down to the top 10 percent of the mineral values in the State, which equate to somewhere in the range of 15 million to 18 million acres, you find that the Native selections cover approximately 11 percent or 1.7 million acres. State lands currently selected cover 20 percent. Expected State selections or hoped for State selections cover 30—an additional 36 percent of the top 10 percent, prior Federal withdrawals, 26 percent, (d)(2) withdrawal lands, about 14 percent, and (d)(1) lands, 45 percent. It just gives you a feel for the mix of the way the mineral potential is stretched.

Mr. HARVEY. Yes. Thank you. Does anyone else have any comments on the Lake Clark area mineralization?

Mr. SHANE. Ben Shane, Alaska Coalition. The basis for my figures was a call to your office, Dave, which the—and my interpretation of those figures, which is that if you take the top 3 percentiles, the top 30 percent of the State's 1976 mineral inventory, it comes out that something less than one-sixth of the mineralized lands are within the Andrus proposal. Now, the State has two mineralized inventories. One was 1976 and one was 1977, and as Dave has explained it to me, there are a number of differences between the 1976 inventory and the 1977 inventory. Two of those differences are, one, that the people who did it knew that it would be used also for (d)(2) purposes as well as State selection by 1977, as opposed to 1976. The second difference is that more information was available by 1977, as compared to 1976, and this brings out another important point that I think should be in the record, which as that there has been a great thrust of research in the past few years through the USGS AMRAP program and U.S. Bureau of Mines and so forth, which may have been very high quality research which was aimed at specifically the (d)(2) lands or the (d)(2) proposals. So you had an increasing level of information in selected parts of the State and logically enough, new discoveries were made. Other parts of the State, where mining might be more beneficial and less in conflict, for example, on native or State lands, were not so studied. The effect of that was to leave the State's 1977 evaluation to include more acres of mineralized land and a higher percentage of land within the various national interest land proposals. Now, there's a number of other figures that Dave gave that I think maybe caused some confusion. For example, 26—he stated that 26 percent of the top 10 percent mineral lands in the State of Alaska are in prior Federal withdrawals. Well, this includes extensive areas such as the national forests which are open to the Mining Law of 1872 and which will remain open to the mining law after the conclusion of this legislation.

Mr. HARVEY. Chuck, do you want to comment on this?

Mr. HAWLEY. Yes. Well, obviously, there's a little bit of reflection on people's credibilty and their scientific veracity in that, but the amount of money spent in research by the U.S. Bureau of Mines and the U.S. Geological Survey is very minimal. It's less than 10 percent of the industry's exploration in Alaska. Further, where the USGS and the Bureau of Mines were to appraise the McKinley area for $200,000, industry would easily spend several million dollars, so there's no comparison in the amount of information being generated, absolutely none. There's 10 times as much industry expenditures and there's probably more like a 100 times, because a lot of the USGS and the U.S. Bureau of Mines' budgets goes to other purposes other than mineral inventory. So there's no—the amount of data is generated in the private sector, the mineral knowledge comes from the private sector, and I think the USGS and the U.S. Bureau of Mines will confirm that.

Mr. SHANE. In response, I'd like to say something.

Mr. HARVEY. This is your last word.

Mr. SHANE. First and most importantly, I didn't mean to impune anybody's credibility, and certainly not Chuck Hawley's and nor the State nor the Federal agencies. I think I'll just leave it at that.

Mr. HARVEY. OK.

Mr. SINGER. I'd like to clarify a minor point, I think. The USGS AMRAP program covered the whole State, except for southeast. We have had quadrangle studies, some of which have had significant (d)(2) lands, some of which have not and have already been done. That's to clarify that point, and the second minor point that may help really in relation to what we have provided so far and in the future is the question related to Mr. Jones' question, the definition of a deposit. As I pointed out earlier, there's not a consistent definition which is widely accepted. There is a way in which we have used the term, though, with respect to our appraisal and that is, whenever we have made a numerical estimate for the number of deposits within the favorable area, that number is consistent with our grade tonnage models, which we'll provide. I think that's an important point with respect to our estimates. Thank you.

Mr. HARVEY. Yes?

Mr. LAMBETH. I'd like to make one brief comment on the economic studies by the Bureau of Mines. These reports were done in recent years and you have to remember, though, that they are a best guess and nothing more, and perhaps the best thing to do is look at the real world situation, that being northern Canada, where the Canadians are mining on the Arctic Islands which are as remote as anything in Alaska.

Mr. HARVEY. Are there any more comments on Lake Clark?

Mr. JONES. Yes. David Jones of the National Parks Service. Russell Chadwick was awarded a contract to make an estimate of the market value of the mineral ownerships in Lake Clark. This was in 1975. It was done under the same terms as I described yesterday in the Morton proposal, and there was a certain definition of market value. I think it might be helpful if he would explain to you how he went about his work.

Mr. HARVEY. Go ahead, Russ.

Mr. CHADWICK. Well, as Dave explained, our chore was a specific one, aimed at existing legal holdings in the area, a lot of them permissability or potential or anything like this, but within the boundaries of the then proposed parks and AEC, there were substantially three important properties and about a half a dozen either defunct or lesser properties. The principle one that's been discussed several times, the Kasna Creek copper/iron deposit, and that is held by a small mining company who has put in about 30 drill holes or had, as of that time, put in about 30 drill holes and the ore was fairly well indicated. And appropo of that, I would say that the reserve, although it's proprietary information, as indicated to date, is such that it would constitute perhaps a half a year's supply of copper for the United States at current consumption rates, so it's an important deposit, it's a strataform deposit that's been only partly outlined by drilling. It extends or is indicated to extend perhaps 10,000 feet in length and is of a thickness of about 250 feet offhand, as indicated to date. It's a major deposit. Certainly the economics are very difficult in that remote area in that particular site. There's no question about that, and to anyone, but it is an important deposit until the last dog is hung and the thing is very well known, it's an important one.

The other two deposits, one is just a little southwest of the Kasna Creek deposit, say 10 miles or so. This is a copper/silver deposit, which at that time had just been barely prospected. It was known from a geochemical anomaly. there were a few holes in it and—but it was indicated to have a substantial width and to be of a grade which, if it continued to persist at that grade, would support an operation in the area, so it was a viable first-class prospect.

And the third one, that is a volcanogenic sequence there and it's a strataform deposit which is likely to persist. It's a real good prospect. The other one that's been mentioned several times, the Chill claims up at the far northeast corner of the proposal, and this is a—as Bob said, a greisen quartz tourmaline mica with copper and substantial silver in a vertical zone of considerable width in a quartz diorite. Again, a type of deposit which is likely to be persistent. At the time, the thing is outlined by a few pits in a talus slope and you can see very little of it, and there had been a couple of drill holes in it, a packsack drill. But at any rate, the totality of this is one fairly well indicated deposit, two substantial prospects. The other things were minor vein type deposits up in the Kijik area, very old prospects known in the literature, all of which have been abandoned or were abandoned at the time and no work had been done on them for some time. There was one old placer up there, but again it was a minor operation, a bouldary little creek, an old prospect and apparently abandoned. I think that's the totality of the then existing legal holdings in the area.

Mr. HARVEY. Thank you.

Mr. FANKHAUSER. Yes. I'd just like to bring out to the committee, in connection with what Russ said, here on these claims, and also in regards to Lake Clark in particular there. We all admit that this is an extremely rugged area that hasn't been explored and I maintain that this is a large reason why there are only three sets of claims or so, maybe more, but in that general area, which his contract or obligation was to assess. Now, I might be wrong but, Russ, you were given the task of assessing the mineral potential out there, which is the crux of what this whole committee hearing is about. In other words, we're also concerned about the preservation of lands for scenic values in the future, but by the same token, we should also be concerned about what the future holds for mining.

Mr. SILVER. May I ask one question? Dave, in terms of your breakdown, (d)(1), prior withdrawals, State, can you break down the prior withdrawals as to those withdrawals that are closed to mining and other withdrawals that are open to mining?

Mr. HANSEN. Yes, I can. We have not, but we can.

Mr. SILVER. And can you also provide one more thing within that—those areas within the forests that are proposed for wilderness, that would be on a practical basis?

Mr. HANSEN. Yes, we can.

Mr. SILVER. And a third thing is whether or not you can break down the (d)(1) areas as to those which are provided as a part of the (d)(2) proposal and those which aren't? I don't know that that would set things to rest one way or another, but I think that is an important consideration.

Mr. HANSEN. We'd be glad to get the information. Yes, we can provide that.

Mr. HARVEY. We all agree with everything that Mr. Silver just said in respect to the legal impact of the proposals.

Mr. SILVER. I understand that.

Mr. HANSEN. What we may need, Mr. Chairman, we may need to come back to the committee and make sure our definitions square with the Federal definitions on which lands are, indeed, open on prior Federal withdrawals. That's one of the biggest problems we've found at this time. One other point on this, the information we have, in answer to your question, the one-sixth of the land—minerals land being included in the Andrus proposal under the 1976 assessment, that is correct. Under the 1977 assessment, it's one-quarter of the land that has mineral potential in the Andrus proposal, which was what Chuck was referring to, so I'm in a fortunate position in both cases.

Mr. HARVEY. Let's go on to the last issue here, the transportation and access.

Mr. BEVINETTO. One question. What's the estimated market value of the mineral claims in Lake Clark?

Mr. JONES. That's $555,000.

Mr. BEVINETTO. Thank you.

Mr. HARVEY. All right. On transportation and access, anyone want to offer any comments?

Transportation and Access

Mr. HARVEY. We've covered this in some degree previously, with respect to the use of planes and boats and ships and trains. Any other comments? Yes, ma'am?

Ms. SAGERSER. Margie Sagerser of the Cook Inlet region. Just as a mater for the record and to inform the committee, I would like to point out a couple of townships of inholdings for Cook Inlet region that have to do with this access question. Now, according to Lake Clark trade, we are going to have two townships right in here that will be for Cook Inlet. Also included in the trade is an easement, so this says that it will—there will be two types of easements, one for a port and one for transportation, and if this is transportation, I don't—you know, it's not specific as to a road or what. But anyway, a corridor type of a thing to the port site. Neither the port nor the easement, itself, is identified at this point, but it's to be mutually agreed upon. OK. So just so everybody's aware now that there is an access question here that's already been talked about, and there have been some things decided.

Also for your information, I might just point out regional holdings that are also village holdings, that is, are subsurface holdings where the villages have the surface. We had selections, a good deal of selections right in here, right in the heart of the proposal. The villagers also have, to date, selections clear up this way from the Iniskin up to the Tuxedni Peninsula. Now, as a part of this Lake Clark trade agreement, which we're in the process now of implementing, these selections would be relinquished. These, however, down here on the coast will stand as valid village and regional selections—village selections, but with regional subsurface. As to the easement again, granted that there will be village lands down around the coast, we're not at this point sure whether we will have to cross only village lands or if there are some other lands that would have to be involved, and it's for this reason that I'd like to bring it to your attention today, and like I said and the fellow from Park Service said earlier, the implementation of the trade is being actively pursued. We have meetings going on in the next couple of weeks and the relinquishments will be forthcoming in the Lake Clark area.

Mr. BEVINETTO. Along the coastal area, what were the basic reasons for the selections?

Ms. SAGERSER. As for the village selections, their concern, of course, at first was areas that touched the coast, you know, because some of this area is rather high. And that's the areas that they skirted around on the first round. So theirs was just coastal. There's minor occurrences of timbered land in here that they were looking for, but specifically it was just some lowlying areas that would keep them out of the mountains.

Mr. BEVINETTO. Present settlements?

Ms. SAGERSER. No; there are no villages, per se. This is over—you know, the villages belong to Cook Inlet. There are no villages. This was their deficiency withdrawal. They're all located on the other side of the inlet and they had to come over here for deficiency withdrawals. OK. There are some settlements, for instance, Port Alsworth was mentioned, which is within the Cook Inlet region, but it was also discussed in the questions now with Bristol Bay and there are some private little things right in here, but as for villages per se, there weren't any located on the coast. This was a deficiency area selection. As for Cook Inlet, I can only say there is probably a negotiated type of a settlement and it looks to mineral prospects.

Mr. BEVINETTO. I understand we have a complete legislative history on these lands. Thank you.

Ms. SAGERSER. OK. Thank you.

Mr. HARVEY. Anyone else want to comment on the transportation and access?

Mr. SILVER. Can somebody speak to the proposed—expanded proposed highways from Anchorage to the Lake Clark area, and where it would go and how it would impact the proposed (d)(2) lands? Is it possible for someone to talk about that?

Mr. SANDBORN. Roy Sandborn with the National Park Service. At one time, there was a proposal for a road to Lake Clark Pass and Merrill Pass both. I think both of those have been dropped as being not feasible.

Mr. THOMAS. Bob Thomas with the Department of Transportation. In thinking over our latest road corridors, we've just skimmed them down to just the bare necessities and they do skirt all of these areas.

Mr. HARVEY. OK. Anyone else? This gentleman right there. Would you identify yourself?

Mr. BONDURANT. My name is Dale Bondurant and I'm with the Isaac Walton League Sportsman Game Preservation Association and the Alaska Public Easement Defense Fund. I don't know whether I'm in the right avenue here. We're talking about access. Is this access just for transportation or public use or——

Mr. HARVEY. For any purpose.

Mr. BONDURANT. OK.

Mr. HARVEY. For the Lake Clark area.

Mr. BONDURANT. OK.

Mr. HARVEY. If there's some situation that we should be aware of, then we want to look at it.

Mr. BONDURANT. One of the new proposals that the Seiberling committee has instigated in relation to access is the deletion of the Alaska Native Claims Act 17-B1 from all Village Corporation selections. This would deny the public access to the rivers, lakes and streams, and so forth that are, at the present time, a part of the Alaska Native Claims Act. On February the 3d, Chairman Seiberling submitted language that would delete this from village selections and some of the points raised were that the Natives did not want the rest of the public of Alaska to have access to these lands. A point that the lady just made was that a lot of these so-called village selections are deficiency selections that are outside the actual villages and they do form barriers along the coast to actual access into these lands that we're talking about, because of the fact that much of the access in Alaska, a big percent of it, is on waterways. If we're not going to have access, even which is already compromised through section 17-B1 of the Claims, and I say compromised, because under the State——

Mr. Harvey. Mr. Bondurant, you and I talked about this before the meeting started. You've raised a legitimate problem, but it's a basic policy issue that we aren't attempting to address here. What we're trying to get in this issue of access is what kind of access is now available to the Lake Clark area, what kind do you think is needed, and any other comments you wish to make about the need for access into the Lake Clark area.

Mr. Bondurant. Well, I don't know how—like I said, I don't know whether I'm in the right ball park or not, but we do need access into these areas and we do need them by waterways, and by the fact that there is a proposal on that to eliminate all public access on the waterways under the Native village selections, I think we do have to address it. I think if you're talking about transportation in Alaska, the waterways are one of the chief means of transportation.

Mr. Harvey. Yes; you've made that subject known. Anyone else have comments?

Mr. Hawley. Chuck Hawley. The identified deposits, the ones that the Park Service investigated, including Lake Clark, Kasna Creek, and the Chill Claims, I presume, would have the right of access to the mining area, is that correct?

Mr. Harvey. They would have whatever rights they have under the mining laws.

Mr. Hawley. Yes; and then what—the principle of that, I hope you address the principle of access for mineral development in the areas where it is permitted, the framework, because we don't know where the corridors would need to be at this present time.

Mr. Harvey. Right. Yes; I understand. Any other comments? Yes, sir?

Mr. Crews. Paul Crews, Jr. I'm an interested party. First, I'd like to ask a question as to what access has been considered so far, as far as air traffic and landing rights or landing ability within the proposed boundaries. At this time, have there been proposals made for landings on water, on sandbars and whatnot, which do not interfere with the ecology of this area?

Mr. Harvey. I'm not sure that I understand your question.

Mr. Crews. Well-----

Mr. Harvey. It's been a fact that people are landing float and other planes on water or sandbars. That's been brought out. That's really what we're looking at.

Mr. Crews. OK. Then I would like to address exactly that point. If we're going to have an area, obviously, it's going to be a resource area or it's going to be a reserve or whatnot. We have to insure that there is access for the public to these areas. Otherwise, it will be of no use to the public. I know that in some Federal lands, specifically, some park areas, aircraft access is denied and I would think that if this were to be the case in these new areas, then the areas would be unusable to the public and I think that it's important that it's written so that water access, because it's natural and it doesn't hurt the environment, the water constantly moves, it's always being renewed, water landings, water access by boat and also wheel landings with aircraft, either on sandbars where it will not hurt the tundra or it won't hurt the land should be insured.

Mr. HARVEY. Thank you very much. Any other comments? All right. That finishes the Lake Clark area. I think we can move into Mount McKinley.

MOUNT MCKINLEY AREA

Mr. STENMARK. Richard Stenmark, Land Use Planning Commission. The next area we're going to cover is the Mount McKinley area, the gray area you see here is the existing park. The darker green colored lands around here are those actually withdrawn in the (d)(2) classification and the lighter green are some of the (d)(1) lands surrounding that that are also involved. Roughly, the boundaries of the various proposals are out in this area. There are some State lands involved in some of the proposals down in this area around Chulitna Lake and back up near Broad Pass, so we'd like you to address your remarks to this entire area here, both north and south of the existing park.

Mr. HARVEY. All right. I think it would be useful, as we go through this on McKinley, if people address the north and make it very clear whether you're talking about the proposed northern addition or proposed southern addition, since they're obviously quite different. On the scenic, landscape values and so on, who would like to open up? Park Service?

Scenic, Landscape, Historic, and Archeological Values

Mr. HARRY. Brian Harry from the National Park Service. I've intermixed the north and south. The greatest concentration of high mountains in the Alaskan Range occurs from the Cathedral Peaks northward for about half the length of McKinley Park. This is a stupendous mountain mass, largely sheathed with snow and ice year-round. The heart of the region is a nearly continuous network of great valley glaciers, each maybe 1 mile to 5 miles wide. They meander through mountains that tower cliff on cliff to heights from 1 to 3 miles. The glaciers on the south side of the range, the Ruth, the Tokositna, the Kahiltna, are 30 to 40 miles long. The peaks here are largely granite. They are highly resistant to erosion. They are broken by widely spaced cracks, many of which are vertical. Weathering accents the vertical joint patterns and the resultant mountains are marked by sharp pinnacles, domes bounded by sheer cliffs. Nowhere in Alaska are jagged spires and high cliffs more abundant as they are here.

Greatest of all are McKinley and Hunter, the Cathedral Spires, and the spires between Ruth and Tokositna Glaciers. On this south side are many spectacular views of Mount McKinley from places all along the Peters Hills to Curry Ridge. Two places are particularly noteworthy. One, the Valley of the Ruth, through the great gorge and the gateway and into the amphitheater are magnificent scenery, deep within the McKinley massif. The other distant view is of McKinley's steep north face, rising 3 vertical miles above the level plain, as viewed from ridgetop foregrounds in the Kantishna Hills. These two are among the grandest landscape views on the Earth.

Mr. HARVEY. Yes?

Mr. GORDON. Richard Gordon, Alaska Coalition. I will discuss only two areas which are examples of concepts and then Doreen Cole of the Denali Citizens Council who lived there will discuss both the north and south additions values more generally. The first concept, Noranda has already alluded to, and it relates to a concept I talked about in Lake Clark where you are able to visualize a vast basin with mountains at the back. In this area, a good example of where you can look from a low rise in a generally level wooded plain, across a vast expanse of completely flat, relatively featureless country at the great 3-mile face at a long distance. The particular visual points for this would be the Castle Rock and the low-hilled tundra-covered, granite-side hills immediately around Chilchukabena Lake. These are in the northwestern portion of the northern addition. This type of vista obviously can be found in many places adjacent to the main mountain ranges in Alaska. The point here is that certain of these places should be included in their entirety in some form, so that the vistas, as a whole, can be experieinced unmodified by man. That type of concept, as I say, is not generally recognized by planners. It takes in a lot of open space and this illustration is good, because there is a lack of foothills in front of Denali. It rises 3 miles with very little foreground, directly above the plain, and the plain is so flat that the contrast between the vertical rise and the flat plan is very, very stark. Your floor and your wall, to put it in design terms.

The second illustration is, there is an indentation in the southern portion of the western boundary there. You can see this little indentation about two-thirds of the way down the western boundary. In this case, you have a geological situation or a—I should say, a physiographic situation in which a river has cut back through the spine of the mountain range. What that means, to put it a fancier term is the hydrographic divide, hydro/water, the hydrographic divide is far beyond the physiographic divide. By physiographic divide, I mean the line of trend of the highest ridgetop of the Alaska Range. The Tonzona River has cut south, southeast, well beyond the crest of the Alaska Range, deep into the mountains, and that type of cutting creates enormously spectacular scenery. Therefore, the area from about Ripsnorter Creek, up to Mystic Pass, which is immediately outside the Andrus proposal and is included in the Siberling Subcommittee Print, is exceptionally illustrative of that feature. It is also found in a few other places in Alaska, but this is an excellent illustration of it.

Mr. ANTHONY. I'd like to ask that fellow a question. Do you mean to imply that the Kantishna mining district shows this kind of a view, for all the Kantishna mining district?

Mr. GORDON. Are you talking about the first view?

Mr. ANTHONY. Yes. Yes.

Mr. GORDON. No; this has nothing to do with the Kantishna mining district. It's not even related to it. It's west of it.

Mr. ANTHONY. All right. Because you won't get a very good view of McKinley from most of the Kantishna district.

Mr. GORDON. That's not what I was talking about, no.

Mr. HARVEY. Yes.

Ms. COLE. My name is Doreen Cole, I'm a member of the Alaska Coalition and the Denali Citizen's Council and I'm, a 10-year resident of the McKinley Park area. I'd like to discuss, first of all, a couple of important reasons for the existence of Mount McKinley National Park in terms of the scenic viewing opportunities. One of these, of course, is Mount McKinley, itself, and until this time, the entire vicinity of McKinley has never been included within the park boundary, which it would be after the extensions are made. The second important viewing opportunity in McKinley is the opportunity to view the unique wildlife that exists within this valley, especially on either side of the park road. It has been long understood in the McKinley area that the wildlife that exists in the park now does not really have enough range to be a complete ecological unit. Dr. Adolf Murie, who was a biologist who did studies in the park for at least 30 years, long advocated extending the northern boundary of McKinley Park to include this area, not for its recreational purposes, per se, but as an important to—for an important reason, to make a more complete ecological unit for the park's wildlife and as a viewing opportunity for park visitors, the wildlife of McKinley are important and unless a complete ecological unit for the park's wildlife is established, the viewing opportunities in the future for the park's wildlife may not be there as they are today, or as they were even better a number of years ago. I'd like to discuss some of the specific areas that are included in the park extensions in terms of their scenic value.

One of the areas is this jog up north, which is called the Toklat River Springs. I don't believe, the Park Service has done any studies to know exactly how much the park bear population utilizes these springs in the late fall but it is entirely conceivable that they would. The bears who use this area in the summertime would go up this far to utilize this area as a place to find salmon, because there are chum salmon running up there in the fall. The springs are open year-round and they are quite a congregating area for other wildlife, particularly wolverine, lynx, and others. The next area I'd like to discuss a little bit is an area that isn't included in this proposal entirely. It's a place called the Roosevelt Hills, which like the Castle Rocks area down in this section, the hills are wooded mainly on either side, but toward the top, include some unique granite outcroppings. Also this area, as a viewing opportunity, is an area important to waterfowl habitat and nesting areas. The Amos Lake area, which I believe is not included here, is it? OK. We're down here. The Amost Lakes area is also important as a waterfowl nesting area and it is a spectacular view from the lowlands to the Alaska Range and to McKinley. Already the Cathedral Spires area and the terminuses of these glaciers on the south side have been discussed in terms of their scenic value. That's all.

Mr. Harvey. Thank you very much. Yes, sir?

Mr. Dale. Yes. I'd just like to ask a couple of questions.

Mr. Harvey. Would you identify yourself, please?

Mr. Dale. Jim Dale. I've worked the northern part of Kantishna for 105 days and I saw one cow moose with a calf and one wolverine. Now, I think as far as getting the bears in a unit or whatever they're trying to do there, they should leave that to game management. That's just about all I have to say.

Mr. Harvey. Thank you. Anyone else on the scenic values? Jack?

Mr. Hession. Jack Hession, Alaska Coalition. A brief footnote, Mr. Harvey, on the major scenic resource, a fact that has not yet been recognized, and that's the Chulitna River which flows along the south side of the present forest that divides the Denali State Park from McKinley National Park. It's a glacial river, but it's accessible by rail or road at the put-in and by the parks highway at the take-out. It provides what I consider perhaps the outstanding view of the McKinley massive as you move along the river, and in terms of the weather, it's generally recognized that on the south side, you have much—many more clear days than on the north side. Just outstanding views, changing aspects as one moves down, looking up the various glacial valleys, and there's another difference between that and the north side. Generally, right up against the base of the mountains, you have a feeling that you're right almost in those glacial systems. I think, just in terms of its scenic resources, it's an area that ought to be protected and I mention it in view of the State's continuing attempts to select lands to the west of the river for what's called more intensive uses.

Mr. Harvey. Thank you.

Mr. Hawley. For the record, you can't see the McKinley massif from the Chulitna River and that there are many more good days on the north side than on the south side. I worked in the McKinley area in 1967, one full season on the south side in the Chulitna area and we did not see McKinley once, partly due to weather, but in the lower valleys of the Chulitna, you cannot see Mount McKinley. You can't see the high country.

Mr. Hession. I don't know what river you were on, Chuck, but I not only saw McKinley, but I saw numerous of the other major peaks. Just a completely wide open view. I don't understand what portion of the river you're referring to.

Mr. Hawley. Well, I'm referring to the point at which the Alaska Railroad crosses the Chulitna River.

Mr. Harvey. Any other comments on the scenic and landscape values? All right. Let's move on to the wildlife values in the area, then. The gentleman in the back? Yes, sir?

Mr. Engle. My name is Clark Engle. I'm a member of the Alaska Professional Hunter's Association and to give you a little bit of my credentials, I've been here in the State of Alaska and professionally hunting for 20 years, and the majority of the 20 years have been in the Alaska Range. The last 10 years have been in this area that they were just speaking about, the scenic value and this, the one that she couldn't find Amos Lake and she knew all about it. I have been a professional in that area. This is my main hunting area. This is where I make my complete livelihood in this country. The area of the main camp is right here at Boulder Creek. I probably know this area in here up into the park and outside the park better than any other human being in the world, because this is my living and believe me, I know what I'm talking about in this area. I've got 12 different camps, outcamps in this area. Some of them are in the expansion of the park, this whole area down here, of course, in fact, one of my best fishing holes down here that I just discovered. The Mystic Pass area has completely gone out of my reach. I've got a camp over here, but it doesn't do any good if I don't have this area in here to hunt. That's where the sheep happen to be. Whoever did this line done a real good job, because they took in most of the wildlife in the area. Mystic—the ripsnorter in the H.R. 39, the line goes right straight through here. This is not correct, not according to the maps in Washington, D.C., at least. The map, I believe it goes right through just below the forks in here and cuts across into this area. At least this is the way they had it marked out in Washington at the——

Mr. HARVEY. Just for the record, the lines on this map, as I understand it, depict the Andrews proposal.

Mr. ENGLE. Well, the ones I saw in Washington, D.C. were H.R. 39. And the wildlife in this area, according to the State fish and game, the moose population in here is excellent and the sheep are pretty fair, too. Now, there the people expound on their knowledge of this area out in here. For your information or their information, there ain't a helluva lot out there. There's a few moose out there in these lake areas over here. This is solid timber out in here, muskeg timber and there's just damn few. Where the majority of your animals in all of this country up here are right along the base of the mountains, this is where your animals hang out. They don't go out here in this swamp. Who the hell wants to go out there? Too tough a going, and it's a fact that this area is well populated in this area. Now, you come into the park area and up along this park area, you look at the caribou to see when caribou come out. When they're starting to migrate down toward this area, sometimes they go out here and sometimes they go on down here and sometimes they stay up in the park and they never do come out. But you'll find, for instance, on moose, you'll find moose potholed in this area, which indicates to me, and again I'm not an educated biologist, but I have talked to biologists that it indicates poor feed conditions in this area, and any of you gentlemen who want to go out any time during the summer or the fall, I'll take you for a 2-hour ride in a supercub here and then we'll go for a 2-hour ride down there and you tell me if this is good game management in a park. It stinks. It's the worst ecological disaster area in the whole damn State.

Now sheep in this area: This is one of the most fantastic sheep areas you could ever imagine. It's got some fantastic graze up in here but no sheep whatsoever up there, absolutely none. You get up into this valley up in here, over into this area and on down into the Rainy Pass area is excellent sheep hunting, but over in this area here, no sheep, absolutely none. Down in this area, you have—the moose population is right probably down this whole area up in here. In fact, there's moose all the way up into the—where the Mystic Pass starts into the forks there, where it goes over into the Shellabarger and up in here where it starts right there, from here on down, there's excellent moose in there at certain times of the year. And some real fine grizzly bear hunting.

There's been a lot of misstatements made on this area right in here, since—just since I've sat in the room and this has only been a few minutes. One of the gross misstatements I ever heard in my life was in Washington, D.C., 1 week ago and I was sitting in a markup committee in the House. Some young fellow got up and they were talking about this area up here, these five sections up here, and the State wanted this to be put in State lands and, of course, the Parks people wanted that. And the gentleman got up and he said, but, sir, he said, this is where the brown bear migrate. Hell, they're not brown bear in the first place, they're grizzly bear, and the grizzly bear don't migrate. I mean, they move from one area to the other, but they don't migrate. It's a misconception. The caribou in many of these areas, like I said, they do pothole. They'll stay in these areas sometimes, other times they'll move on out.

I traced a tremendous herd one time that came down through here. I lost them way down in the south fork in the timber. I wasn't that sure where they went to, but I suspect they went down to Big River, where there's another herd apparently comes up from the south up there, from the Mulchatna herd, and it was—it just happened to be the year that all the caribou were in the Denali disappeared and so the caribou are migrating animal and they don't stay—they won't stay within the bounds of this thing here, unless you put a "helluva" big fence up, and I doubt very much whether they'd be able to do that, especially in this area right here. It's a pretty tough area. They're talking about this area right in here, the—I can't even tell you what it is now. Cathedral Spires. As bad as that lady that didn't know where Amos Lake was.

The Cathedral Spires, in the Secretary of the Interior's Office a week or so ago, he had a beautiful picture up there of the Cathedral Spires. I was admiring it and he said, yes, he said, you know, it's a beautiful area, but he said, you can't see it anywhere from the ground. You have to get in an aircraft to see it and, of course, as I understand it, you have to fly a couple or 2,000, 3,000 feet above the land surface, so you could see this area in here. Right in this area here in the rough part, there are no sheep. There's nothing up in there. There ain't no food up in there and it is a tough, tough country. There's a few climbers that have gone in there periodically, but very, very few, and I feel this type of a country can protect itself. There's nothing ever—if they found gold up in there, I don't know how the hell they'd ever get it out, but maybe with a snow machine or something like that, but this is a tough country over in here. You get down into this area down in here and there are sheep down in here and up along the slopes right along this area and over on the other side, and they go up into this Mystic Pass area up in here. This is an area, this whole Alaska range, is where I spent 20 years of my lifetime, probably over $200,000 that I've put in this, and I'm only one man. Tomorrow, I'll be able to furnish you with maps of these areas that the guide license and control board has allocated areas for guides, so you'll know just how many people you're putting out of business in this area here. They haven't got the maps done here, but they will have them done shortly. They called me and told me this morning. I'm on the guide license control board, by the way, I'm one of the board members, so I've helped allocate these areas. This area in here and the shallow up into this part in here and all the way down through here, there's quite a few people that will be completely out of business. There hasn't been much said, apparently, about the guiding industry. Let me give you a few facts.

Mr. HARVEY. Let me ask you a question. When you say people will be out of business, why?

Mr. ENGLE. All right. You take this are here, this is only one of the areas that we're talking about. You're talking about—over in the Wrangells, you're talking about the Brooks Range, you're talking about probably two-thirds of the best sheep country in the State of Alaska. You take two-thirds out, there's only one thing the State has left to do, is put everybody else on permits.

Mr. HARVEY. In other words, the reason you say that is that you assume that there will be no hunting allowed in that area?

Mr. ENGLE. This is right. This is my assumption. I'm sorry, I should have specified this.

Mr. HARVEY. That's all right.

Mr. ENGLE. Everything I've seen in any of the legislation has been no hunting in this, except in the markup committee, where they took this area out here, because of trappers and hunters and miners up in here. But you're talking about, say, taking two-thirds of the sheep range away from the State. The other third will go on permit basis. An outfitter, a professional hunter, can't operate on a permit basis, absolutely no way he can. He has to have—If you're talking about a professional, now, there's a difference between a professional and a part-timer. A part-timer just takes 2 weeks and takes a guy up in the area. I'm a professional. I go into here in June, the first part of June, and I spend all the way through October in this area and I don't come out except to get groceries once in a while. We work in this area, building the camp up, cleaning them up. My—I would venture to say, this area in here is probably cleaner than the route going up to McKinley. I would venture to say that without a doubt. In fact, I'd lay a "helluva" lot of money on it, because we take—for instance, we take—up in here, Mystic Pass, we take all these other areas where I have different camps, we haul the garbage back into the main camp and bury it. We don't leave it out here for the bears to scatter around.

A park fellow was in here one time at my Boulder Creek camp and he said, gee, this is nice and clean in here, and I said, yeah, like a park should look like, and he agreed with me. To get back to the guiding industry, as a whole, why, you're talking a $30 to $40 million business a year here in the State and I know this doesn't come up to the power of oil or mining or commercial fishing, but it does—it's a year after year after year after year thing, and it is an essential thing. It's something that has been going on since there's been man damn near in this State and it should continue, we feel, as a profession, a viable profession. For instance, I think in 1975, we figured up that 80, 90 percent of the biological bill in the State was paid due to nonresidents. That was the P.R. matching funds and the nonresident tag fees and the licenses. I didn't figure it up for the last couple of years. Now, just where is that money going to come from if they take all this away and put the professional out of business and the nonresident doesn't get to hunt in the State? Is there somewhere in the legislation that says they're going to allocate $5, $6 million to the State to run the biological fund? Another question I asked in Washington, D.C., is, what are they going to do with us, the professional that's put out of business because they claim that they want to preserve this country? Which is a play on words, they're not preserving the country, it'll end up like McKinley, eventually, with nothing there. Preserving it is harvesting it, taking care of it. The protection of the land is essential. Every professional in the field recognizes that we must protect this land. We can't build a city over here with a big dome on it and expect moose to be around it, absolutely can't be done. So we have to protect the habitat of the animals. This is the first thing that the professional has said many years ago.

I don't know if you gentlemen are aware of it, but in 1973 the professional hunters put a booklet out on (d)(2) lands. Did you see any—any of you gentlemen see those copies?

Mr. HARVEY. Yes.

Mr. ENGLE. And at that time, we said the property must be protected, it's essential that the land be protected, but again what worries me is the speed that the Congress is going through this. I don't feel that they're getting the complete facts in Washington D.C. It's like the bear migrating up here in McKinley. Now, this is not a fact, this is just somebody's assumption that this happened. They do probable walk down the creek down there, because there's fish down there, but—because I walk a little bit, too, but I don't call that migrating. So it is essential that we protect the habitat and get—we've got to allow that—this country to be utilized. I think that is the essential point.

Another point is that we, the professional hunter, have always been adamant in is the control by the State of the wildlife within the boundaries of the State, just like our Constitution calls for. It calls for that and we feel that this is a necessity. We can run the game here in the State. I was just talking to Congressman Dingell in Washington, D.C. and he said, well, you know the State's record of running the wildlife in the State is not too hot and I said, this is true, Congressman, but I said, if you go back far enough, I said, before we become a State, the Federal Government didn't do so damn good either, because most people don't know that they tried to eliminate every damn wolf in the State of Alaska through Federal control, poisoning them. You don't see the State doing this. We can run the fish and game in the State. We've got some damn fine biologists up here, some very, very dedicated men and we can do it, but we can't do it with a big 5-inch howitzer around our neck from Washington, D.C. that gives a jerk every time that they don't agree back there with their white-collared people that don't know what the hell is going on up here in the State.

I think I've said enough. You know my position, I think. I think that we have to protect the land, yet it has to be utilized. Sure, I'm interested in this area. I'd like to see it chopped off right there at the border. In fact, I'd like to see this whole border just kept like it is. And I know that there are pressures in Washington, D.C. from people that—environmentalists or so-called environmentalists. I don't call them environmentalists. I, personally, am an environmentalist. If I don't have any sheep and bear and moose in this country, everything I put in there isn't worth a penny on a hundred dollar bill. So if for no other reason than finances, I've got to be an environmentalist. These people, as far as I can discern, are antipeople. They're anti every damn thing in the State of Alaska and the majority of them, I feel, don't know what the hell they're talking about. Like the lady that didn't know where Amos Lake was. Thank you, gentlemen. I think I've said enough.

Mr. HARVEY. Thank you. We would note for the record that the lady to whom you referred is a resident of Alaska

Mr. ENGLE. She still didn't know where the hell she was.

Mr. HARVEY. Anyone else have any comments on wildlife values? Yes, Brian?

Mr. HARRY. Could I make just one addition? Wildlife figures are sketchy at best, but our figures don't jive with what I heard—what I thought I heard Clark say. He expressed that two-thirds of the sheep would be foreclosed by the Park proposal. Our figures from hunter tags are that the range would be somewhere between 38 percent and 10 percent of the sheep kill for the last 5 years, would be in Park proposals, with the likely percentage being 32 percent and perhaps our figure is in error and I'd like to ask to have correcting figures to update ours, if it's indeed two-thirds, because our data doesn't show that.

Mr. ENGLE. Mr. Chairman, might I comment on that? Might I comment on these figures?

Mr. HARVEY. You may. Can you sit down there?

Mr. ENGLE. Yes, thank you. These figures, I saw in Washington, D.C. while I was there. The Park Service has these. They worked these up. One thing I don't see in these figures, as you gentlemen probably are well aware of, you can take a percentage figure and use it any damn way you want. You can make it look good for you or you can make it look bad for the other guys, and these figures are doing just exactly that. They're showing the amount of kill, not the hunting right. We're talking about the right to hunt. Where in hell does it show in here, the amount of people that went up there and didn't get a sheep? Everybody thinks, because a guy goes hunting, he's got to kill something. This is wrong, this is not true. Many of the people that go up in these ranges don't kill. They go up there to enjoy themselves. A fellow I just talked to in Detroit the other day said the most enjoyable hunt he ever had in my country was when he didn't kill a damn head of game, not one. That figure doesn't show in here. This is a kill record entirely, and that shouldn't be. I think essentially what we're talking about here with this type of figures is the right to hunt, is what we're talking about.

Mr. HARVEY. I understand your point.

Mr. ANTHONY. Yes, Jimmy Dale and I know quite a bit about the game population of Kantishna. I mined in there in the early 1960's and was in there pretty steadily, and there was a lot of game around there then and by the way, for the record, the principal hunters in——

Mr. HARVEY. Did you say there were a lot of game? I'm sorry, I couldn't——

Mr. ANTHONY. There was a lot of game there then, yes.

Mr. HARVEY. All right.

Mr. ANTHONY. And there's very little there now, and for the record, the principal hunters that used to come into Kantishna were Park Service employees.

Mr. ENGLE. They know where the good hunting is.

Mr. ANTHONY. In fact, they shot my pet rabbits right in my front yard.

Mr. HARVEY. Yes, sir, go ahead.

Mr. TROYER. Will Troyer, National Park Service. I'd like to make a few comments on wildlife. I have been doing some research in there for several years. Just in general, to set the record straight, we do have approximately a thousand Dall sheep in the National Park now, and as Clark mentioned, there's not too many in the western end, but primarily from the McKinley bar eastward. We also have somewhere between 750 to 1,000 moose in the park. Again, most of the moose are in the eastward end of the park. We don't know to what degree yet, but we do have some migration of the moose to the northward, that migrate out the river valleys, particularly between the Kantishna Hills and the Healy area.

And as most of you know, we have several packs of wolves that operate in the area, but I feel that—in addition, a lot of grizzlies are viewed along the road and so forth. I feel one of the big issues here and one of the most important things that should be discussed as far as the big game is the caribou population and how it relates to the boundaries and within the existing park and so forth, and if I might, I'd like to put a few maps on the wall, because in the last 2 years, I have had a number of them radioed and have been following this caribou population for several years and I think it's exceedingly important that you understand the movement of these animals as they now exist and so forth.

Mr. HARVEY. Does anyone else have comments on the wildlife?

Mr. GORDON. Three things. First of all, in regard to the fact that there are relatively low populations of the large ungulates in this northern plain in McKinley, as I talked yesterday about the ecosystem concept, that concept does not relate to having the highest possible population. That probably could be gained by shooting off all the wolves and by managing, but that is not the ecosystem concept. The idea is to preserve the natural process of self-regulation and you may end up having less animals than you would if you were managing it for maximum yield. The second thing, Clark said quite correctly that the brown bear—that grizzly bears do not migrate. Like, bears go where there's food, where they can find food. But let me quote from the Alaska Department of Fish and Game with regard to the resource on that northern tongue, that extension to Toklat Springs.

> The area is located at the confluence of the Sushana and the Toklat River. Based on aerial survey data, an average of 50,000 chum salmon spawn in the Toklat River annually. The Toklat River supplies all chum salmon to the commercial and subsistence fisheries in the river downstream from the middle to the mouth of the Yukon River. Obviously, an important resource to protect. Toklat chum salmon also provide the mainstay winter food supply for a major portion of the brown grizzly bear.

That's the Fish and Game Department's name for that animal, the population in Mount McKinley National Park.

The third thing I wanted to mention is a conceptual thing. The Kantishna Hills are proposed as—by Subcommittee Print Three, which just passed the Interior Committee, House of Representatives, as a National Park Service Preserve. The definition as it has been developed is an area which is open to mining, mineral entry and hunting. The rest of the northern extension, the lowlands, is proposed for National Park, which means that the area would be closed to hunting all the way across the western park boundary.

Now, I want to submit two thoughts in this regard. No. one, the—there is a need, this is a policy question, but it relates directly to the resource issue, there is a need to delineate the proper use or nonuse, noncommodity use, of the fish and wildlife resource from the use or nonuse of the mineral commodities. There is no present classification in the Congress that does that. What the administration and the Alaska Coalition have proposed is that the national preserve concept be used for essentially creating national parks with hunting, in other words, that a National Park Service area would be preserved in its natural state, with no commodity extracted uses other than existing rights, open to recreational as well as subsistence hunting.

Mr. HARVEY. That concept does exist and there are preserves now.

Mr. GORDON. But they're open to oil extraction. But the preserve concept, as it now is applied and as the House subcommittee wants to continue to apply it, it would say that in the preserve, you can mine and you can hunt. In the park, you can't mine and you can't hunt. What I'm suggesting, and this is the best illustration of it in the State of Alaska, you need to do a helluva lot more refined planning, and let me give the example. The Kantishna Hills area is a mineralized zone. One can debate on how important it is. If the tradeoff is to be made, I don't support this, that continued mineral entry is to be allowed in that area, OK. Let's set up that preserve, that particular segment of national preserve, to be open to continued mineral entry, but closed to all hunting, because the—practically the sole purpose for the northern extension is as one of the five major sanctuaries, major no hunting zones in the State. If you have the Kantishna Hills open to hunting, you defeat the whole purpose of adding it to the park.

The second concept, and here I am speaking for myself, not the Alaska Coalition, in the westernmost portion of this area, you have probably the best wildlife productive habitat, the best fur bearer population. It is near an area which is locally used for trapping and wildlife subsistence, but not legally subsistence hunting. I would argue—the Coalition disagrees, that in that immediate area, this is along the northwestern fringe, the area should stay in the park complex, it should be preserved. I don't think there's any disagreement about preserving that habitat. But in consideration of the local needs, I would suggest that that area, that fringe, I'm not talking about very many townships, be preserved, open to hunting, but closed to mineral entry. So I'm suggesting to you that the House has done an insane job of planning. If you're going to make the tradeoff, make the tradeoff to fit the need. Thank you.

Mr. HARVEY. Thank you. All right. We're going to adjourn until 2 o'clock.

AFTERNOON SESSION

Mr. HARVEY. The workshop will come to order. We were in the course of discussion of the wildlife values of the McKinley area. There's been considerable discussion. Does anyone have anything to add? Yes, sir?

Mr. TROYER. I'm Will Troyer, National Park Service. I am a wildlife biologist, and I mentioned that I had some maps of the movement of the McKinley caribou herd, which I have up there now, and I'd like to make a presentation of them, if I may. I think I'd probably better come forward to do that. OK. The information I'm presenting here today is based on the last 2 years of research study that we have done on the McKinley caribou herd. The McKinley caribou herd, of course, is one of the major herds in Alaska, and like a lot of the other herds in this area, has had a drastic decline. In the forties, we had 20,000 to 30,000 animals, depending on who you were speaking to, and we probably don't have over about 1,200 left today. But I'd like to, in general, kind of point out the general movement pattern of these animals as we know it today, where their major calving areas are and so forth. This particular map here is the major calving areas that were used in the last 2 years and usually the calving areas and the post calving aggregation areas are pretty traditional, and these have probably been in use for a good many years. The most important area is the so-called stampede area, which basically lies between the Toklat River and the Sushana River, and from the foothills out just past the Stampede Road.

The south side, what we call the Cantwell area, includes some of the mountains and lays out and includes the Dunkel Hills area over to the Cantwell Creek. Last year, we didn't detect any calving east of the west fork of the Chulitna River, but this year we did. That's why this little black area is added. Basically, what happens here, in about the first week in May, caribou move over these passes here, the ones that are going to calve in this area, and a portion of the herd calves here, the rest of them—some of them are already wintering in this area and calve in here and once they're through calving, by early June, then they also come through these passes and move—there's two major passes going from the Tetlanika over, some of these are almost 6,000 feet high, but they all—the cows and calves, after calving, concentrate in this area for a period of time. The ones that get over there and calve in the beginning there, from the first of May, and the rest get over there in early June and then they stay in this area until about July the 15th and move back out over the mountains then move out along the road and that's when you hear about the migrations that the tourists all look for.

And then what I have here is the July, August, September, and October uses of the area, and as you can see, the last 2 years, the basic—this year's pattern was basically the same as last year. They stay within the park boundaries here, and then both last year—and I should say that this—these movements are based on visual observation as well as radioed caribou. We had 16 radioed caribou, which allowed us to follow the herds on this, so I felt we got a pretty good information on the total herd, because our radios were distributed well within the total population. In November of both the last 2 years, they split right here at Wonder Lake. The herd concentrated here in October, early November. About two-thirds of the herd went over into this area in the north, along the north boundary, and last year they wintered primarily south of the Stampede Road in the Sushana Hills and so forth. This winter, this group is wintering primarily north of the Stampede Road, and I'm not sure what you call these hills in here, but in that hilly region in there. The ones to the west were again about a third of the population, both last year and this year are wintering in this area here. There's a small group that's wintering around Bearpaw Creek here in the Kantishna Hills.

Now, there has been some movement through these hills here, but it's primarily going from this area to that, although during the calving season, there were some in here. This is actually a small calving area. It's not near as important as these two. But I'd like to emphasize here that as far as the caribou population goes, these two areas are the critical areas. the calving areas and the postaggregate calving concentration areas. I would be the first to point out that as far as their wintering ranges are, they won't necessarily continue to follow this. Historical information and past observation indicates sometimes—and like Clark Engle indicated this morning, they move out to the westward here and it's also been known that they've been going up as far as Minchumina Lake. We haven't detected that in the last year, none of our radioed caribou have been up there, but probably small groups have moved. I'm talking about the herd that's followed this pattern in the last few years. And also in talking about caribou populations, usually when a herd is large, then they expand their boundary uses and I would guess that then they would probably tend to more likely go out toward Minchumina Lake and so forth. When they're small, of course, their movements usually aren't quite as far. This area here, I suspect that when the herding is large, that's a very confined area, that possibly they may expand that and go further south. I don't know. We don't really have any records that indicate for sure that that's the case, because the Nelchina caribou herd is just across the way and there may be some intermixing in there, and there's no doubt about probably some intermixing out this way, too, amongst some other populations in the wintertime. But I wanted to emphasize these two areas on this.

Mr. Bevinetto. What caused the decline of the caribou herds?

Mr. Gordon. I don't think anybody knows what caused the decline and I'd like to point out here, because I'm sure some of the hunter people are going to jump on me about that. I don't feel it was the hunting that caused this decline. I think it's a combination of natural factors. There's very little hunting pressure been on this herd, as near as we can tell. There is, as somebody pointed out, a little bit of hunting out here in the Kantishna Hills, but it's been minor, considering the total population of the herd and possibly up around Minchumina and out to the westward, but as near as we can tell, hunting wasn't a big factor in this decline. Caribou populations, as a whole, do fluctuate somewhat over a long period of time and some biologists try to—and people say, well, it's wolves, it's range, it's migration from one herd to the other and it's—you know, various factors I believe it's a combination of factors and we don't understand the entire reasons behind these declines at the present time. So I'm not blaming it on the hunting. That's about the only thing I have to say on the caribou, unless somebody else has some questions on it.

Mr. Harvey. Thank you very much. Does anyone else have any comments on the wildlife? Yes, sir?

Mr. Bishop. I'd like to use the board, if I may, also.

Mr. GORDON. Go ahead. Those maps are also for the record, if you'd like to use them.

Mr. BISHOP. Fine, thank you.

Mr. HARVEY. Is there anybody else that wants to make a comment while this gentleman is putting up his maps? Yes, sir?

Mr. MARTIN. Pete Martin, Alaska Coalition. And I'd just like to make a basic comment in behalf of the coalition. From a standpoint of, let's say, upholding the integrity of the northern extension, because it does represent part of a larger ecological unit, which includes the park, as was mentioned, wintering of caribou north of the present park boundary is an important factor in maintaining many of the caribou that are seen within the park during the summer, and this also holds true with moose and to a certain extent with wolves. There have been, through Gorden Haber's studies, I think, three different wolf packs have been studied and identified in the park and these packs often go north during the winter, north of the present park boundary here and, of course, when they do, why, there's a great danger that they get trapped out. Historically, this is what has happened, so it has reduced the wolf population of the park, which is supposed to be largely undisturbed and functions in the pattern that it was intended, and so from that standpoint, we consider the northern extensions to be part of a larger ecological unit, which was never completely satisfied with the arbitrary boundaries that were drawn here. As has been mentioned many times in regard to wildlife, we don't really have a lot of the answers to the wildlife situation. We don't even know all the questions asked, probably, to find these answers and so if we can let nature work over a larger area, a more integral ecological unit, I think that there will be a greater change that the integrity of this unit, which is a combination of predators and ungulates, I think that this balance will be better maintained.

Let's say, perhaps hunting pressure hasn't, per se, reduced the caribou population in this area, but perhaps because the caribou populations have been so reduced in other herds, say, the Nelchina or some of the ones to the northwest, that the migration from this herd, the McKinley herd, has been greater into these to help fill that void that has, at the same time, less than the McKinley herd. These are the dynamics we don't understand yet and I think that by having the north extensions in particular, why, this will lessen the chance for man to make an error. It will also, I think, actually work to the benefit of Fish and Game management. To a certain extent, because one of the most difficult things to do is to inventory the wildlife resource and even to monitor the hunting pressure with success and by having larger units in which actually nothing can happen except natural processes, you actually would tend to have a buffer against decisions that might otherwise tend to reduce the population of animals too much. I think, historically, in Alaska the problem in wildlife management hasn't been one of underharvesting, but probably overharvesting. But I think the integrity of the north extension is basically a wildlife extension. There are some really critical habitats that need to be considered.

In this area up in here, there are some springs along the Toklat which harbor year-round, mallard duck populations which should be considered also. I think that although this may seem periferal to wildlife management, there should be a general curtailment of mining within the north extension. Otherwise, I think this will tend to have a great effect on wildlife habitat and on what could happen to the integrity of the wildlife habitat, as well as the scenic habitat that we've already discussed. And that's really all I have to say right now. Thank you.

Mr. HARVEY. Thank you. Any other comments? All right.

Mr. ANTHONY. Some one from State Fish and Game?

Mr. BISHOP. Yes.

Mr. ANTHONY. How many caribou were killed in the Kantishna area this past year?

Mr. BISHOP. This past season, I don't have the figures for. Last year, I believe it was about five or so.

Mr. ANTHONY. The year before?

Mr. BISHOP. Oh, I don't recall, but——

Mr. ANTHONY. Last year it was low?

Mr. BISHOP. I'm speaking of—let's see, last year was 1976.

Mr. ANTHONY. So it was the year before?

Mr. BISHOP. It was five the year before that.

Mr. ANTHONY. 1975?

Mr. BISHOP. That is the last year it was open, yes. I don't have anything to show when it was closed.

Mr. BISHOP. Mr name is Dick Bishop. I'm with the Department of Fish and Game in Fairbanks. The north extension of McKinley Park falls in Region Three of our administrative regions for the Department of Fish and Game and my position is Regional Supervisor for that region. Some comments I'll make will be based on the information that the Department has, my own experience living a couple of years at Lake Minchumina, and the results of a subsistence use study sponsored by the Parks Service and done by the University of Alaska, on which I worked in this area last year.

I'd like to add a little historical perspective, because I think it's important in the consideration of the wildlife and its habitat here, and that is that there's archeological and anthropological evidence that people existed in this area for thousands of years prior to the advent of white use. There have been people in this area for roughly 70 years, that is, white people, and there have been residents in the Minchumina area and various other localities here, principally in relation to gold seeking, since the early 1900's. At Minchumina, the first permanent settler was about 1914, and there have been people there permanently and in varying numbers since that time. By and large, the Native population has shifted from there, due to various reasons which I don't fully understand, but they include migration and disease. So it's principally, at this time, a white settlement.

To the west of this red line lies Telida, 14 miles off this map, and as you can see from these lines here, they do use this area and have in the past. Most of these lines represent trapline trails and they have existed for various lengths of time. Many of them since around 1914. The bulk of them were developed in the 1920's when trapping, as an accessory to, in some such cases in place of prospecting, was very active. Many of these same lines have been used until the present time, but by a succession of people.

This particular area, I think as someone pointed out before, is largely low-growing or short black spruce and scattered stands. Much of this is a very gradual outwash or slope from the Alaska Range. There is a considerable number of bogs and flats down here and it's a rather monotonous terrain and scenery, but it is an important wildlife area. Major species that are found there include moose, caribou and in reference to caribou distribution, there are scattered small groups, as Will Troyer suggested, of caribou that do use some of the areas further from the present park. Wolf, wolf numbers there in general are moderate at the present time. Black bear, grizzly bear, wolverine, otter, mink, martin, beaver, lynx, and various other small game and waterfowl. There are roughly 70 people living in or near the proposal area, principally near, rather than in. There are about 25 people in Telida, about 25 in Minchumina, a few in Kantishna, 1 or 2 at Stampede and some seasonal occupancy of the Bearpaw area. There's several Native allotments in the area, either actual or filed for. There are some Native group selections up here near the Muddy River. One of the allotments in here, and there are some historic sites that have been proposed by regional corporations. There are also some State lands that fall in this general area here along the lake.

Most of the present use in this north extension consists of either subsistence or recreational use and I'm using a very broad definition of subsistence. Perhaps I should say local use, rather than subsistence, just to avoid that particular problem. People from Minchumina use much of this area that's attached to it by these various trails. The principal use of this area is for martin trapping.

The principal uses of the Muddy River Flats are for moose hunting, beaver trapping, mink trapping, to some extent, martin trapping. The principal use in this area is for trapping also. There is also some some recreational hunting here. There is some hunting where the prime purpose is for food. There's a fair amount of recreational hunting and trapping in this general area. Over here where Mr. Engle was talking about this morning, there is recreational hunting, both guided and unguided and for sheep and other species and there is an area where there is one couple who lives principally on a subsistence basis. Traplines from Telida run all the way up into this area and where these darker lines are. In the past, the use by people from that area extended well into the foothills and actually into the park, itself. Similary, that was the case with Native peoples living in the general Minchumina area. I estimated that there were 45 to 50 people who were using or to some degree dependent on resources from the proposal area, and in fact, I was at that time referring to the original administration proposal rather than H.R. 39, which has considerably expanded this particular boundary.

The estimated takes for animals from the proposal area, and again I emphasize not this proposal, but the administration's initial proposal, moose 25 to 35, caribou, 5, wolf, 5 to 10, black bear, zero to 5, grizzly bear, zero, wolverine, 10 to 15, otter, 15 to 25, mink, 30 to 90, martin, 400 to 700, beaver, 150 to 250, lynx, quite variable, 10 to 300 and possibly more. There is very little subsistance fishing within the proposal area at the present time. There is considerable, adjacent to it. At Minchumina, however, there the take of fish range, principally whitefish, from 8,000 to 13,000 fish, and the take in that area was on the order of, as I recall, 5,000 to 7,000. There's also some subsistence fishing in this area for dog and human consumption. At the present time, as far as transportation goes, there is no surface transportation into this area, as you're undoubtedly aware, except for snowmachines, dogsleds or boats of one sort of another. Airplanes are used to some extent, but there is very little use by airplanes of most of the proposal area, because it's not particularly amendable to aircraft use in most cases. Some sport hunting does occur by aircraft, but not a great deal. Most of the hunting that occurs in this area, particularly within the general proposal area, is—in this area, is local use. Over here, we're talking about principally recreational use.

I could talk a little bit about sheep populations, but before I do that and before I forget it, I'd like to submit as part of the record, a map very similar to this that shows much of the subsistence use information and also a draft copy of the report that I submitted to the Park Service, which probably will become available to you through normal channels, but you might as well have it now, I guess.

The distribution of sheep is variable. As someone pointed out this morning, and it's been our experience, looking at the sheep habitat selectively, the particular area in here where there are a few sheep is basicaly very poor sheep habitat and that seems to be principally dependent on terrain and the vegetation growing on it, but in the counts that we've done in this general area, there—it doesn't appear to be very good sheep country. I mentioned that this is principally a black spruce, gentle sloping area out here, and it's true, it's not particularly good for some of the more popular or more obvious species of game, such as moose. It is good caribou winter range. Caribou wintered in numbers up to Minchumina and the geneal area around here as late as 1964. I mentioned a few still do. It is or at least it has been reasonably good caribou range, and as Mr. Troyer pointed out, we're not sure to what extent range may be a problem in the decline of that particular caribou herd. However, one of the most notable things about wildlife in this area and——

Mr. HARVEY. Would you clarify that last statement?

Mr. BISHOP. Sure, I hope so.

Mr. HARVEY. Well, I guess I understood you to say that you thought that much of that north extension was good caribou range.

Mr. BISHOP. OK.

Mr. HARVEY. On the other hand, the herd is apparently not getting into there very much, at least in recent years.

Mr. BISHOP. OK. I tried to back up. It has been prime or principally used at least as winter caribou habitat, the flats out in here and over into this area towards Telida, and in the past, substantial numbers of caribou did use that area. There were fair numbers of them as late as 1964 that came into the area of the lake and actually crossed the lake, itself. I reneged on the statement, because we don't really know if it presently is good caribou winter habitat or not. The caribou aren't using it and whether or not some change in the habitat had to do with the decline of the caribou, we just don't know. But whatever the reason may be, there aren't that many caribou using it now.

The principal attribute in terms of wildlife of this particular area, much of this area, is as fur bearer habitat and although it may appear to be relatively unproductive in other terms, it is and has been and continues to be one of the most productive areas from the standpoint of martin population and trapping of martin. Portions of it are also excellent beaver habitat, although because of changes, natural changes in water conditions, it doesn't seem to be as good as it once was. But in much of this area, to reiterate, the prime wildlife that it supports is fur bearers and that, in turn, was perceived and taken advantage of by people over the last 50 years and led to the result—resulted in the development of extensive traplines, which have been used more or less continuously during that period.

Mr. BEVINETTO. How many commerical trappers are in there now?

Mr. BISHOP. There is a potential of 12 trappers. If everyone trapped all at the same time, you'd have about 12 trappers operating in this area, however, that practically never occurs, for one reason or another. To give you an example, one person froze his feet 3 years ago and he frostbite them again this year and that knocked him out of trapping for this year. Another man moved for the year. So it's quite variable, but the usual number has fallen around anywhere from four to seven and it is quite variable. I guess that I'll conclude with that, unless there are questions that you'd like to ask.

Mr. HARVEY. All right. Thank you. Did you have a question for him?

Mr. DALE. Jim Dale, president of Kantishna Miner's Association. What advantage to the caribou and the moose would it be to close the Kantishna Hills to mining?

Mr. BISHOP That's a fairly comprehensive question, but I don't think I can fully answer it. I think what you're asking for is my opinion of whether or not it would be important as caribou range. I personally, don't think the change would matter a great deal to caribou habitat.

Mr. DALE. Thank you.

Mr. HARVEY. Yes, sir?

Mr. ENGLE. Mr. Chairman, Clark Engle again. I'd like to ask Mr. Bishop a question, just for my own clarification. You said down there in the southwest side of McKinley on the sheep population, how much flora identification has been done by the Fish and Game Department in that area?

Mr. BISHOP. Not a great deal.

Mr. ENGLE. Has there any been done in the last 5, 10 years?

Mr. BISHOP. I don't think so, no.

Mr. ENGLE. Well, you just made a statement that there is, you know, poor vegetation down in the area, and I just wondered how the State knew that, since it's very seldom that the Park Service will allow State people, whether they be geologists or biologists, to go into the park to do any identification of anything?

Mr. BISHOP. Based on the experienced observations of our people who were counting sheep there, they felt that the topography and the vegetation, the types of vegetation as it grew there, as it appeared from the air, did not compare with prime sheep habitat.

Mr. ENGLE. Well, for the chairman's clarification, too, there's a book out written in 1930, 1931, and 1932 by William Beech. He came down through that area from Wonder Lake, in fact, he came down all the way from Healy and he identified that whole area in there, here and the whole area in there, and at that time there was a lot of sheep in this area. They didn't shoot them because it was a park at the time, but he did identify many sheep up in that area.

Mr. HARVEY. Yes, sir?

Mr. TROYER. Can I make a clarifying statement on that? Will Troyer, wildlife biologist, National Park Service. I think I pointed out a while ago that when populations are large, they tend to move into areas that are, in terms of minor habitat, not as good as the others. When the populations are low, they pull back. This holds to sheep, too, and Clark Engle is right, historically, we have had populations of 4,000 and 5,000 sheep or better in the park and at that time, we do get sheep that move into those areas in the western end. The eastern end of the park has the good sheep habitat and one of the reasons that we don't have them in the western end is because they tend to migrate in the eastern end, also out of those high mountains, and move to the western range there on the north edge of the park, and we don't have those kind of mountains on the west end and I think one of the reasons that we don't have as high of populations in that area, so if you had a series of bad winters in the west end there, you'd soon lose your sheep in there, where if you had mild winters, it possibly might build up. We do have approximately 1,000 sheep in there and, incidentally, annually, the Fish and Game does come in and make surveys on them. So we don't keep them out.

Mr. ENGLE. Mr. Chairman, I would like to point out that the border of the park does not stop weather or sheep. On the south part of that, you have an excellent sheep population. The park border, you know doesn't stop the bad winters from going one way or the other, causing a depletion of the game. I'd like to ask Mr. Troyer how much work has been done on the flora in that area by the U.S. Government, if any?

Mr. TROYER. I haven't done any work outside of the park on the west end at all.

Mr. ENGLE. I mean, in the park.

Mr. TROYER. No, I haven't done any, but we've had two people recently working on a vegetative study, and that includes the park and the north side. We've just recently put on another student from the University of Alaska on a doctorate's assignment to do a long-range 4-year study on the vegetation and strictly on the vegetation, so I don't feel that we can say that we haven't done anything, because there has been considerable work done in the last 2, 3 years, primarily with the caribou range, but it has also got into the mountains somewhat.

Mr. BISHOP. One other comment I guess I would make for people's interest and information, the moose population, in general, in this area is not very high right now and principally it seems that that's symptomatic of much of the interior and it seems to be primarily related to the fact that a few years back, we had some severe winters, and in other areas, we have documented the impact of severe winters on moose populations and although we didn't document it in this area, similar weather conditions pertained and almost certainly had similar results.

Mr. HARVEY. Thank you. Any more comments on the wildlife? All right. Let's go into renewable resources.

Renewable Resources

Mr. ROGUSKI. Gene Roguski, Alaska Department of Fish and Game. I'd like to make just a few brief comments on the sport fishing values in this area.

Mr. HARVEY. Go right ahead.

Mr. ROGUSKI. On the southern McKinley extension, annually there isn't a big deal. It's limited principally to grayling fishing in areas such as the Upper Yetna River and access is principally by light aircraft, both wheel and float. Much of this sport fishing is probably in conjunction with hunting trips. A few words on the north extension. This area, the whole general area, has a number of rather small, shallow lakes. Some of these lakes are devoid of fish. Others have populations of northern pike, grayling and many of them are also important for summer habitat for lake fish in years when the water is high enough to allow accessibility from the rivers to these lakes. The Kantishna River and the Toklat River are—as mentioned previously as having runs of salmon, principally chum salmon, king salmon, which are important principally for subsistence use. The angler use of this northern area is principally by float aircraft again, for some of the pike fishery. Probably the largest sport fishery in the area is for pike in Lake Minchumina, and because it has the large airstrip, many people with wheel planes can land there and fish at these sites.

Mr. HARVEY. Yes, go ahead.

Mr. SOMERVILLE. My name is Ron Somerville, with the Alaska Department of Fish and Game. I'd like to point out that whereas the park boundaries here are designed for the ecological wildlife reasons the southern extension, from the standpoint of fish and wildlife, seems to violate every one of those principles. From this standpoint, the black bear, grizzly bear, and moose which occupy the southern portion spend almost three-quarters of their time outside of the extension area. Moose, in particular, are the most popular hunted species here, hunted extensively by the particular recreational users, the Kahiltna area, Chelatna, Sunflower Basin, and the east fork and west fork of the Yentna. This is the State park here and has some moose populations in this are, but obviously it's already closed. So most of the hunting is in this particular area here. The moose move out of the areas in the winter and down to the lower parts of the Kahiltna Glacier and the flatlands in here, the Yentna, along the bars and the areas along this area here. Also into the Peters Hill, Mount Yenlo, the Fairview, in here into Home Creek, these are popular wintering areas. In other words, although they occupy this in the spring, summer, and the additional fall hunting periods, most of these moose move out of the part of the proposed park boundary here into adjacent, what is not State lands. This is a potential firing line type situation here and it would be desirable if some type of management program on an ecological basis could apply to these particular species. Thank you.

Mr. BEVINETTO. I have a question. What percent of the statewide big game killed comes from the Yentna area?

Mr. SOMERVILLE. From just the Yentna, I'd have to get that specific for you. The kill in the lower part——

Mr. BEVINETTO. It is the whole lower part?

Mr. SOMERVILLE. It probably is in the neighborhood of 100 to 150, but it also includes Peters Hills and some areas outside of it. To break it down just to the park, I would have to look that up specifically.

Mr. BEVINETTO. Animals?

Mr. SOMERVILLE. Yes. We're talking probably about 100 to 150 just in this area here, again, part of that coming outside of the proposed extension.

Mr. HARVEY. Are there any more comments on the wildlife? We have to cut this off, but just a few more. Yes, go ahead.

Mr. ENGLE. I just wanted to ask Ron if he had any estimates of how many people went in there hunting and didn't get a moose? Has Fish and Game got any estimates at all in that area?

Mr. SOMERVILLE. We could give that information to the committee of the number of people we estimate. I'd have to take that off the harvest tickets specifically, but we could get that for the committee.

Mr. HARVEY. OK.

Ms. SAGERSER. Just for the record, I'd like to ask, there is a grayling stream in the Kantishna/Moose Creek, which also has some king salmon, I guess, at the mouth of it. Also I'd like to add that the Alaska coalition feels that it's very important that the area to the north be included as Park status, as has been mentioned before, rather than as preserve. One of the reasons being that—Well, it's been told about the declining caribou population and it may well be that by creating a preserve in the northern extension, which would include sports hunting, a greater pressure would be put on the caribou population, which is already in small numbers.

Mr. HARVEY. Thank you. Let's move on to the renewable resources area, timber, agriculture.

Mr. GRAHAM. Mr. Chairman, Hatch Graham with the Forest Service. As has been mentioned in regard to wildlife habitat, the northern extension is rather extensively forested, but with black spruce. Only one intensive forest survey has been made in the general area of this proposal. That was in 1973, conducted in the northern extension. Only a little over 25,000 acres of commercial forest land have been identified. The standing existing volume in there is about 150 million board feet of saw timber or the equivalent of 28 million cubic feet. Scattered over an area like this, we would not consider this anything but marginal for commercial forest.

Mr. HARVEY. Anyone else have anything to comment on in the agricultural, or forest values?

Mr. QUARLES. Some of that land is agricultural land, though, isn't it?

Mr. GRAHAM. Alan Epps may want to comment on that.

Mr. EPPS. Alan Epps with the Cooperative Extension. You're right, there are some agricultural lands. In fact, part of the area that the State has indicated up here on this map for selections, the bulk of it, in fact, does fall into agricultural soil groups, however, it is approaching a rather high altitude and would be considered somewhat marginal from an agricultural standpoint, except for some of the more short season crops that will tolerate a light frost. Other than that, the agricultural impact of the extensions here are rather slight.

Mr. HARVEY. Any other comments on agriculture or forestry?

Mr. ANTHONY. The amount of timber there is more than adequate for the hard rock mining in the district.

Mr. QUARLES. All right. The next issue is the non-Federal lands, the land selections. It appears we have no one from the State Departments Natural Resources here to read their assessment.

State and Native Land Selections

Mr. HESSION. Jack Hession, Alaska Coalition. In view of the committe's interest in the identification of conflicts, I think it's appropo to mention that at least two of the State's identification areas are in conflict with the habitat requirements of the McKinley herd, as outlined by Mr. Troyer. Namely, in the Cantwell area and in the Stampede critical habitat areas.

Mr. HARVEY. The State selections are in conflict with the habitat? I don't understand.

Mr. HESSION. In view of the phrase that the State uses, more intensive uses, they've identified them for mineral potential, for a number of nonpark values. To give you an example, in the Cantwell area, they're interested in mineral values. The State has a location-type mining law, in which case that area would be wide open to mining at the same time that the caribou were attempting to use it for critical habitat.

Mr. HARVEY. I understand. It's the anticipated use, rather than the ownership problem?

Mr. HESSION. Yes, and Mr. Gordon reminds me that currently State legislature and the Alaska Society as a whole is embroiled in the issue of homesites, homesteads, and disposal of the public domain of the State. In that case, of course, there is even more threat to the caribou habitat. Thank you.

Mr. HARVEY. Any other other comments?

Mr. MORGRIDGE. I'm, Dean Morgridge, Alaska Oil & Gas Association. The area I want to talk about is know as the Minchumina Basin, and I'll give a very brief geographic description of the boundaries. On the southeast, it generally follows the foothills of the Alaska Range, down about as far as the Castle Hills, on the south end, generally along the north fork of the Kuskokwim River, on the northwest, the Zitziana River, as far as the Tanana on the north, and the eastern boundary is generally south from the Village of Nenana to the—to the park boundary or park extension. Part of the potential hydrocarbon bearing area does extend within the southwest edge of the present park boundary, and this will be more particularly described on a map which I will give the committee.

We're talking about an area of roughly 6,500 square miles, of which roughly the southern one-half is in this proposed northern extension of the park. The potential hydrocarbon bearing section, the section which is interesting to petroleum geologists, is generally of Tertiary Age, although there's a good chance that older rocks of Mesozioc and Paleozoic Age may underlie portions of the basin area. This Tertiary section, which I refer to, is exposed in the foothills of the Alaska Range. Some of the more important exposures, as they pertain to this basin area, are in the Teklanika and the Toklat River drainages, and around the margins of the Kantishna Hills.

This is a section of some roughly 11,000 feet thick and it contains many of the requisites for a hydrocarbon bearing section, and this is including both hydrocarbon source and reservoir quality rocks. I'd like to point out that in age and in lithologic character, the type of rock, the section I'm talking about is identical to the producing section in the Cook Inlet, which, as you know, is a major hydrocarbon producing basin. Cook Inlet has something like 1½ billion barrels of recoverable oil in it, and some 5 trillion cubic feet of gas and this section that is marginal to the Minchumina Basin is the same type of section as far as the depositional environment and lithologic character and age of the section. I do want to make the point that we would like to have reasonable access to these sections, that one reason why so little is known about this particular area is that many of these sections do lie within the park boundaries and in the past few years, it has been extremely difficult for a geologist, particularly a geologist of an oil company, to get inside the park boundaries. For some reason, when you go inside the park and you have a geologic pick in your hand and a compass on your belt and your interest is in the rocks rather than in the fauna or flora, you have a real problem, at least we always have.

Mr. HARVEY. You feel the basin extends into the park, the basin, itself?

Mr. MORGRIDGE. I feel the basin extends into the southwest portion of the present McKinley Park area.

Mr. HARVEY. Yes, very good. OK.

Mr. MORGRIDGE. And I don't know whether you all have received the U.S. Geological Survey report that covers these areas, but I believe it shows the same thing. There are some reported hydrocarbon seeps in general. The ones that have been reported, and these are not necessarily confirmed, they're inventoried by the Geological Survey, are generally present to the east of this basin area. They've been reported on the Totatlanika River, at the head of Clear Creek and where the old winter sledding trail crosses the Wood River, and these areas, these three areas that I referred to, are generally east of the Nenana River. There has been one well drilled in the northern part of this Minchumina Basin. The reference is located in section 7, township 4 south, 10 west. This well was drilled and abandoned in March of 1962, and this well penetrated 3,000 feet of this Tertiary section, which I described earlier, and beneath the Tertiary section, went into Birch Creek schist, which is a petroleum basin so far as the oil industry is concerned. I have a copy of that well here, a lithologic log to show the committee. Each of the heavy lines here represents 100 feet of drilled section. the yellow colors are sands, the red circles in the white background are conglomerates, and the gray colors here are siltstones, fine grained rocks, shales marbles, and so on, and the black areas here are the interbedded coals in the section. And again, this section, particularly the lower part here, is lithologically very similar to the Tertiary section in the Cook Inlet Basin. I can't give you a copy of this, because it is confidential, but I can give you a electric log from the well which you can obtain from the State, if you wish.

This particular well at this location only penetrated 3,000 feet of Tertiary section. It was drilled near a gravity high and a reasonable interpretation, not necessarily an optimistic interpretation, but a reasonable interpretation of the gravity data indicates that we could have up to 15,000 feet of this Tertiary section within portions of this potential basin outline that I described to you. And, of course, we are asking that these potential basin areas not be placed in a single use category at this time, so there is an opportunity to better assess their hydrocarbon potential.

I want to make one other point in closing. Within the entire interior of Alaska, 275,000 square miles, fully one-third of the area is in the form of a topographic basin that could also be a sedimentary basin. Within this entire interior region, there have only been eight wildcats drilled. On the other hand, on the southern coastal basins of Alaska, there have been 180 wildcats drilled. About 145 in the Cook Inlet, 10 wildcats in the Bristol Bay Tertiary basin, and perhaps 25 wildcats on shore in the Gulf of Alaska Tertiary basin, and the question has come up in the past, well, if you all think the interior of Alaska is so hot, how come there haven't been more wildcats drilled in these interior basins, and the reason is, based on my own personal experience over the last 25 years, is that many of these 180 wildcats have been drilled on the southern coastal basins, were drilled because of the much more favorable exploration economics of the southern coastal basins. My point is that now with the Trans-Alaska Pipeline, this economic bias that has existed toward the southern coastal basins of Alaska is much less pronounced today than it has been in the past. Of course, I remind you that the TAPS line does have a capacity of 2-million barrels per day and present estimates of Prudhoe Bay productions are in the range of 1.2-million barrels per day, so there is an excess capacity that is available with the addition of pump stations along the line and if there is a reasonable investment climate in Alaska and if there is land availability, I think you'll see some exploration, much more than you have in the past, of the interior basins in the State. Thank you.

Mr. HARVEY. Thank you. Any more comments on the energy values? Yes?

Mr. SISSON. Alex Sisson of the Alaska Oil & Gas Association. I'm just going to refer to the southern addition or the south extension of the McKinley Park area. The area in here, up in this area right in here and up the headwaters of the Kahiltna, are within the so-called Susitna Basin. The Susitna Basin is approximately in an area, the outline is about like so. That is the Susitna Basin. However, to the north, the upturned edges of this basin, there are older rocks. Here in the Susitna Basin, the potential would be in the so-called Tertiary rocks. Underlying the Tertiary rocks are older so-called Jurassic or Cretaceous rocks, which are upturned in part in this area in here, so we are requesting that some sort of access regulation be made, so we can look into—one, two, three, four—into this area approximately like this, so the conflict. The conflict is in here, in that area right there, and I have the maps here which will be up there for you. But that is approximately the outline. We would like to go in here to do this, some field geology. Are there any questions?

Mr. HARVEY. Am I correct that what you're talking about is wanting to do some drilling to help evaluate the basin? However you wouldn't actually be hoping to discover oil and gas in there?

Mr. SISSON. No; there would not be—probably not be any drilling in this area as far as oil and gas petroleum geologists are concerned. He'd want to go in there as a field geologist with a helicopter, to pick up some samples, to measure a few sections, and to take those rocks back for laboratory studies to project into this area. That's all. So we would like to reserve that right.

Mr. BEVINETTO. I'd like to ask Mr. Morgbridge to put the outline of that basin in the same grease pencil.

Mr. HARVEY. Are there any other comments?

Mr. ANTHONY. Coal potential hasn't been addressed. Will you address that? Go ahead.

Mr. BANNISTER. Coal potential is secondary to the oil and gas at this time, and in a much more distant time frame. There is some coal known in the northeast extension. Just outside the southwest extension, contractors working for the Bureau of Mines rediscovered a coal outcrop in excess of 100 feet thick. This is probably a part of the Minchumina Basin. Extensive coal seams probably lie out in that basin. That's about the thickest section of coal known in Alaska.

Mr. ANTHONY. There's another coal shown in that southeast corner in that basin that Alex was talking about, the old Buckley Mine area, and there was a little bit of coal shipped out of there and some studies made with it. It's a good potential coal for future use.

Mr. HARVEY. Yes. The USGS?

Mr. SINGER. Don Singer of the USGS. In the northeast part of the northern addition, there's the possibility of uranium. The same formations that contain the coal also have been explored actively in the last few years for uranium minerals. To the best of my knowledge, there has not been any success at this point, but they still are looking and they're encouraged by the geology.

Mr. HARVEY. Are there any other comments on the energy area? OK. Yes, sir?

Mr. GILBERT. Mike Gilbert, with the State division of geological and geophysical survey. We have done some brief preliminary sampling programs and have some sampling programs in the northern addition, in the area east of the Kantishna Hills and found no indications of any uranium. Thank you.

Mr. HARVEY. Yes?

Mr. ANTHONY. That still doesn't rule it out.

Mr. HARVEY. Everyone knows that an area is never written off. Chuck, did you want to comment?

Mr. HAWLEY. Well, uranium was found and drilled for by private companies.

Mr. HARVEY. Any other comments on the energy area? Getting into the hard rock minerals area, Leo, would you like the Government to illustrate what they know and then you can go on?

Nonfuel Mineral Resources

Mr. SINGER. With respect to this southern addition, we have four areas that have been delineated which, in some parts, overlap these southern additions. The first of the areas is an area called area 37. It's in the southern part of the southern addition. There is known placer gold, some silver, platinum, tin, and uranium in this general area. There is past production and there is potential for further production, apparently. There is also vein gold and—I should say, vein and probably some tin deposits that are known, but very poorly explored at this point, within this particular area. Particularly the northern part of area 37 is favorable for additional tin deposits. The second area, area 38, in the eastern part of the southern addition, and there are four known breccia pipes which contain gold, silver, copper, and lead in this area, and a few others possibly in the type of geology that exists there.

There are also several tin deposits that have been discovered just recently in this area and there are others—I shouldn't say just recently. They have been discovered, and others are possible in this area. In addition, there are at least 10 deposits that contain some chromite and/or nickel and copper, with traces of platinum. These have not been thoroughly explored. Some of these are a fairly recent discovery. There is also a potential for porphyry copper within area 38. Again, area 38 does not include all of—or is not completely within the southern addition, so there are parts of it that go outside, but we would estimate that there's a 90-percent chance of at least one deposit, a 50-percent chance of at least two, and a 10-percent chance of at least four within our area 38.

Area 39 is in the western and central part of the southern addition and within that area, there are disseminated and massive chromite deposits that have again recently been discovered, but incompletely explored. There is one apparently low-grade copper deposit, and a few others are possible, based on the favorable geology. There are indications of porphyry molybdenum deposits in this area. There are rocks that are favorable for uranium in part of this area. The fourth area for the southern addition is our area 43, which is in the very western part of the southern addition. This area is very poorly explored. Part of the area contains some massive volcanogenic deposits which were discovered in recent years, and the area is favorable for additional discoveries. It also contains tin and silver bearing disseminations in veins, the extent of which is not completely known. It contains two copper skarn deposits, which contain zinc, among other things. There are a variety of vein deposits containing gold. These metals are not all within each individual vein, but there are a variety of veins that contain a variety of minerals, gold, silver, lead, zinc, antimony, and minor tin have been found in our area 43. There is one known deposit that contains silver and lead minerals in disseminations in carbonate rocks, and there are others possible. Again, some of these have not been thoroughly explored. With respect to the northern addition, we have two areas that are delineated which are related to this area.

Our area 42 is almost completely enclosed within the central part of the northern addition. That, as will be discussed by other people, I'm sure, has numerous gold placers, numerous small tonnages, with quite often high grades of deposit metallic veins containing gold and silver or other metals. It contains antimony bearing veins. It also contains felsic and intermediate volcanogenic deposits. It is estimated that this area contains between—a 90-percent chance of at least 5 such deposits, a 50-percent chance of at least 7, and a 10-percent chance of at least 12 such deposits.

The second area in the northern extension or northern addition is in the eastern portion of it, and this is a small part of our larger area 41. Within our area 41, we have estimated that there are—there's a 90-percent chance of at least 4 felsic volcanogenic deposits and a 50-percent chance of at least 9, and a 10-percent chance of at least 20 such deposits within this large area, and as I mentioned earlier, there's also favorable geology within this region for uranium deposits. There are a variety of other mineral deposits which occur within our area 41, which I do not think are necessarily indicative of this particular addition, so I won't discuss them. I think a lot of the information, particularly on the Kantishna, will be covered by industry, so I won't talk further about that.

Mr. BANNISTER. Yes. D'Arcy Bannister, Bureau of Mines. That's one of the areas where we completed our field studies. Although, as Mr. Hawley pointed out, it's a low-budget study compared to industry, there has been a great deal of new data gathered the report is in the mail. You'll get a copy as soon as it is edited and released. I have two maps that summarize the results here one equivalent in scale to the one on the wall behind Chuck Hawley. The other is one to a million scale. Both are for your use.

Mr. HARVEY. Are these—are similar maps going to be available for all of Alaska?

Mr. BANNISTER. We're trying to prepare comparable maps in each of the major (d)(2) areas that we study.

Mr. HARVEY. You have not studied the non-(d)(2) areas to the same degree, is that correct?

Mr. BANNISTER. Well, not under this program. We have authorization to study particular areas. We didn't do it in-house. It was done under contract with someone who had expertise in that area.

Mr. HARVEY. The reason I'm interested is that I know that the members of the committee are going to ask. If someone says there is a mineral there or there are mineral deposits in this area, for example, I know that they will ask, well, are there similar mineral deposits elsewhere that we are not included in the (d)(2) proposals?

Mr. Bannister. From that standpoint, no, we're not preparing comparable maps of all areas of Alaska. However, level 1 and level 2 studies cover all Alaska. Now where data is lacking because industry did not explore it, Chuck Hawley will make the presentation. He was under contract and did the actual on-the-ground work.

Mr. Harvey. Go ahead, Chuck.

Mr. Hawley. OK. Chuck Hawley, as a contractor for the U.S. Bureau of Mines. The Bureau of Mines received about $300,000 to study the Lake Clark and McKinley areas and in 1976, they negotiated a contract with me of about—for about $200,000, to evaluate the McKinley area mineral resources. By agreement with the Parks Service, it does not include the park, itself, or at least no field studies were made in the park. We did cooperate in setting up the type of appraisal on the (d)(2) lands outside the park. We tried to do two things, because of the limitation of time and budget. We knew that there were a considerable number of older deposits that should be examined. Also we knew that there was quite a bit of new country that had not been looked at, but should be. So we went first to evaluate the known, then the unknown. In that we had the advantage that the State of Alaska Geological Survey had, only the year before, had a mapping study in the Kantishna area. There was quite a bit of information.

The U.S. Geological Survey was working on the south side of the park. We obtained general geologic information from them. Then also we had the help of the prospectors and miners in the district. For the main results, I think I'll get out the map. The most significant thing is that there are three main mineralized areas peripheral to Mount McKinley National Park. One of them is in the Kantishna area or the Kantishna trend. It actually extends from the Toklat Hills to the Kantishna Hills. It's buried by tertiary rocks and sediments in here and emerges on the other side of the park and continues toward Fairwell. In this belt are Paleozoic, metamorphic rocks that contain relatively high background amounts of metals throughout the area. The other known region is the Chulitna belt on the south side of the park. Then there is a belt on the southwest side of the park not known previously, that we called the Dall Trend.

One of the most significant things in the Kantishna Trend is that I think that we now have some idea of the significance of the deposits that have been known. The deposits that the old prospectors worked on, besides the placer gold deposits, were high-grade deposits of silver, lead, zinc, and gold. Most of these little black dots represent high-grade deposits, some of which were exploited on a small scale. But what we have found in the study of the metamorphic rocks of the Kantishna Trend is that the rock series, that underlie this area have an abnormally high metal content. There are at least two or three different types of rock that have this high metal content. There are black shales, which have a high background content of silver, gold, antimony, zinc. There are acidic volcanic tufts that have a high content of silver and gold. So anyway we have a series of spots, but geologically these spots are probably just redistributed from a fairly continuous metalliferous terrain. Is this too detailed?

Mr. Harvey. No; go ahead. You're a geologist.

Mr. HAWLEY. OK. Anyway, we established that there is a kind of a bedrock control. There is a reason for these high-grade deposits.

On the south side of the park, there's a strong mineral trend that's been recognized for a long time. The deposits are copper, gold, tin, tungsten, and silver. Recently, we've found that there's a certain class of granitic rocks that contain tin deposits. These orange-colored intrusions are of the type of igneous rock that almost always is enriched in tin, tungsten, beryllium, and uranium, and that locally does contain ore grade concentrations in or near it. So we have established a favorable area for exploration.

The Dall Trend is interesting. Until the last few years, all the rocks on the south side of this big fault, a major fault called the Denali were thought to be relatively young, Mesozoic rocks. We now know that there's a sliver in here of Paleozoic rocks. This little sliver is displaced from someplace off up in this region. That is apparently the reason for this mineral belt. The green areas on the map are areas of geochemical anomalies, fairly consistent. This belt contains ultramatic rocks, dark igneous rocks that are characterized by high contents of chromium, nickel and copper. Through here are a series of another kind of deposits that have copper, silver, gold, lead, zinc, nickel, just about everything in them.

Anway, basically, it turns out that the McKinley area is highly mineralized. That is about what it all boils down to.

Mr. HARVEY. Chuck, let me ask you a question. In your judgment, and you've been in other parts of Alaska, too, is the mineralization any more intense or is it, you know, the highest level of intensity or the medium level or what, than anything else in the Alaska Range, for example?

Mr. HAWLEY. This—I'd say it's similar?

Mr. HARVEY. Typical?

Mr. HAWLEY. Yes. It's typical and so there might be places that would be deposits. I would like to get into a kind of a rating system that I tried to use when we were talking this morning about deposits. Because I am not subject to the same kind of constraints as the Bureau of Mines and the USGS I have split these things out into resources, which are things that might be minable or might not be, and then reserves. Reserves, by definition, are things that can be mined. Since there isn't any mining in Alaska, that's a tricky classification. So arbitrarily I said, if it was a small deposit, it had to contain over $100 per ton. If it was a large type deposit, a bulk type deposit, it would have to contain over $25 a ton to be minable. These are the kind of theoretical grades that compute the reserves and resources. When you do this, you can identify reserves that should be minable in the Kantishna area. Most of them are small, at least the high-grade materials, but there are apparent reserves along the order of 10,000 to 100,000 tons and some deposits that are minable. There are resources in excess of billions of tons of material which is not minable, but which could contain minable grade materials. There is a significant antimony resource. I think the reserve that's minable is on the order of about 3 million pounds, which is equivalent to the past production of the area. There is a resource of about 10 million pounds of antimony. The Stampede Mine was the second largest antimony mine in the

United States. I'm fairly certain that there's more antimony left than has ever been mined.

Mr. HARVEY. That mine is no longer producing. It's not mined out, though.

Mr. HAWLEY. No; I'm saying it's not mined out. There are reserves in place in old workings and there is extensive potential for other deposits in the area. I think that the other significant discoveries are, one, that there could be chromite deposits, and two the silver/tin type of deposits, which had not been recognized, but are now known to exist in the area. I think maybe there are people here that have specific properties that would like to comment.

Mr. HARVEY. Thank you.

Mr. DALE. Jim Dale, president of the Kantishna Mining Association. I have to get to the map for just a second. I'd like to mention, there's some people up here working every year and there's about 30 groups. Now, I mined right here on Eureka Creek, on Wheeler's Mine on Glenn Creek, Basal Mines at the bottom end, Glennwood equivalent mines on Spruce Creek, Copperberg Mines on Caribou, and McLain Mines on Moose Creek. I could go on and on, but it's really, you know, immaterial. The point I want to make is, there's a lot of people back there that make their living mining.

Mr. IMESON. How many?

Mr. DALE. I know of 30 different placer operations. I'm not a hard rock miner. I don't know how many hard rock miners are in the area. There's a few that I know of. I know of a few, but there's 30 placer miners. Now, if we talk about economics and livelihood, this is the only livelihood I've got. I've been a miner for since I was 14, that's 17 years. I've got a wife and three boys. The other guys there mostly take their families, too. I spend $49,000 last year. That's got to bring some economy into the State. Some of the other miners spend a lot more than I do and they make good, too, you know. The minerals are there. I can prove that. I brought just a few thing out of a sluice box. You may pass this around. That's pure copper inside and that's some of the gold. What I'm trying to say is, I don't think it's the opinion of the Kantishna Mining Association that this land should be locked up or we should be kept from mining there, because this is our livelihood and it's good livelihood. You can take your family with you, you can join together in a mutual, you know, business. There's money there for everybody that wants to work. I don't see why anybody should have the right to take our rights away from us.

I've been there 4 years. The Wheelers have been there 12, 14 years, and who should be able to come and take those rights away from us? That's what I'm asking. They can't say the minerals aren't there, because I can take anybody and I'm not a geologist, I'm just a placer miner, and I can take anybody through those hills and show them high-grade deposits of what you're looking at here copper, stibnite, antimony, gold, you name it, it's there and it would be an injustice to the United States to lock it up.

Mr. HARVEY. Thank you very much. Is there anybody else?

Mr. JONES. This is David Jones of the Park Service. The same contract that we entered into with Chadwick in 1975 also called for the delivery of appriasal reports, estimating the market value of the known mineral interest in the McKinley and expanded McKinley. He did it on the same basis of the other by the definition of market value, which I read to you, gave to you yesterday, and it had to do with the Morton proposal and since you asked last time how much money it was, his estimate of the market value of all the known mineralization is $2,078,000.

Mr. HARVEY. Now, that would include the additions?

Mr. JONES. The additions, that's right.

Mr. HARVEY. Basically, it would include the mineralization that's shown on Mr. Hawley's map? It wouldn't include it down on the south side. I mean, I'm talking about from the Morton proposal.

Mr. JONES. Yes. It did not include the area of the Bureau of Land Management and Park Service drilling use, but it included the rest of the areas of geological concern.

Mr. HARVEY. That would include the Kantishna Hills area?

Mr. JONES. Yes, that's right. I should make one other clarifying statement that's going to come up, and it might as well come up now. In 1965, the Park Service requested a withdrawal of about 10 square miles in Kantishna. That was posted on the record in the Federal Register, and as of 1965, that area in withdrawn location, and some way, somehow, there's going to have to be some people that are maybe in trespass there, but I just laid that out for what it's worth.

Mr. SILVER. When did you say that contract was formed?

Mr. JONES. Chadwick's contract was in 1975.

Mr. HARVEY. Go ahead.

Mr. ANTHONY. I had asked for a copy of this report under the Freedom of Information Act, and we got part of the report, but we didn't get all of it. We can't get a property breakdown out of these people.

Mr. HARVEY. That's correct.

Mr. JONES. I could respond to that. The way that I took the Chadwick report——

Mr. HARVEY. It's not subject to the Freedom of Information Act, that kind of information.

Mr. JONES. OK. Than there's no need to get into it, then, is there? I've got the answere. I don't have the individual property estimates he wants and he's not going to get them.

Mr. BEVINETTO. That information, they're correct that they don't have to reveal it under the Freedom of Information Act.

Mr. JONES. We can't reveal it.

Mr. ANTHONY. Isn't it included in that proposal?

Mr. HARVEY. Yes.

Mr. BEVINETTO. Mr. Jones, those appraisals were made under the same conditions that you stated?

Mr. JONES. Absolutely, under the same contract.

Mr. CHADWICK. This matter of market value is a confusing one and it is, perhaps, a red flag, because a market value could mean anything, and as a matter of fact, Dave knows, but between us, I had a hard time reconciling the idea or getting the objective of the study in mind and we went through three drafts, I think, before I finally understood that this market value is essentially not an appraisal of the value of the minerals, indirectly. It's an appraisal of what the property would bring if it was offered for sale on the open market to a buyer for cash and this is not, of couse, the placer gold arrangement between a prospector and a buyer. There is virtually no such thing as a cash market on a trade. Unless the property is completely drilled out and known, the normal business is done in properties on the trade by means of an option agreement and the prospector wants to maximize his take. He is willing to take not immediate cash, but have somebody do some work and ultimately find the value of the property. But the criterion that the Park Service used in this study was this one of market value, which is an immediate sale for cash, and these being mining properties, the unpatented ones, of course, are not available for any other use except mining and so that you're talking knowledgeable people in the mineral industry, what they will pay for a prospect or a property in its then condition, and that is essential to understand the dollar values involved in this thing.

The area and the general geology in the mineral belts, I think, have been well described by Chuck Hawley. The study included both those or all those old properties within the park boundaries, the then park boundaries, themselves, a number of properties in all of the Kantishna area, the then valid or subsisting mining claims, the—a few properties on the east side, one north of the boundary and State lands and the proposed additions at that time, the Foggy Pass landstone within the park on the east side, several scattered properties along the southern addition, south of the park. The number of properties, seems to me it was about 60 properties, all total, and the older properties are well described in the literature and in some private reports that are available one way or another. There's quite a lot of ground to cover, but with the chopper, why, of course, it is possible to visit them and I did visit every one of these properties and determined that among those within the park, to start with, there is, on the north front of the range there, what I would term a migmatite zone, a zone of mixed rocks, structurally complex also, on the north flank of the granitics and within the migmatite zone, all of those properties from the Eielson deposit, itself, at Mount Eielson, westward along the front there to Slippery Mound, beyond Slippery Creek, I guess, but somewhere in there.

A number of deposits, all somewhat similar and most of them, because of the complexity, quite limited in size and of grade. Now, of those, to get rid of that trend in there, the Eielson deposits have been well known for years, they've been described in Government literature, they've been measured. They're very interesting deposits, borderline commercial, because of the area involved, but they have not been explored and I think in any other place than the—than within the park and a very visible site, why, they would have been thoroughly explored. As it is now, they amount still to a prospect and there are obvious extensions that haven't been explored and so forth, but looking at it from the standpoint of this market value business, it's perfectly clear that one would have to do a very major exploration project, which would be done at another place, hasn't been done, so that the market value is quite limited there. You're working with a limited tonnage and a limited possibility. The others are mostly small, limited deposits. They are in areas that are fairly well exposed. They are bare rock, most of them, the existing exposures. You can geologize them pretty quickly.

Coming westward at the headwaters of Slippery Creek, there is one deposit, the Shannon copper deposit, which is an old one. It's got quite a long exposure of disseminated mineralization and granitic rocks. It is the kind of a prospect which; anywhere else again, kind of copper prospect with some precious metal values, that would anywhere else. It's a kind of popular prospect now among the big companies, the big porphyry type copper thing. But it's marginal in grade—as it's exposed along there and we did sample it. It's in a tough situation and in that instance, again, under this criterion, at market value, it has a very limited value.

There is the Foggy Pass limestone that is an obvious bed if one can use a limestone deposit in Alaska at this moment. It's a great enormous thing for anybody that's seen it, it's astronomic in size. This is a limestone sequence in there, which is high grade cement rock, and it's exposed on the side of a valley in there near Foggy Pass and it's perfectly obvious, you don't have to be a miner or anybody else to tell. You can mine it cheaply and—but it's uniform in composition and the tests have been made, Government reports have been written. It's a very good limestone deposit. On the other hand, there are other limestone deposits in the State of Alaska, although that one is also near transportation, the railroad, while some of the others are, too. And so that and the market in Alaska at the moment is limited. It would take a tremendous capital cost to get any limestone project going or any cement project going in Alaska, so consequently, despite the obvious virtues of the deposit as a source of cement rock, why, nevertheless, it has, under this criterion, a limited market value and it would take, perhaps, a doubling or something on that order of the current cement markup to warrant a viable cement industry in Alaska.

Up in the Kantishna, there are—I think I identified 24 separate properties which could be small producers. As Chuck has said, Kantishna is a poor man's camp, in mining terms. There are small high-grade properties which have been, in the past, mined by individuals, could be, ostensibly, in the future mined by individuals if there was the facility there to take that kind of ore and there are small high-grade properties. The geology is fairly or reasonably simple. There aren't too many mining problems, good access and so forth. There are some 20 patented claims and 4 unpatented claims that have more or less obvious viable small vein type deposits on them, however, individually, at the present moment, without any central milling facility, they have a nominal market value. However, it's conceivable and any larger mining company that went in the area would probably try to consolidate those properties and put in a central mill and to have them contribute to a central milling operation. So that in order to—and the objective of the study was to make the best assumptions that were possible, to arrive at the best market there might be under these criteria, so that we used the criteria of consolidating those deposits and running an analysis of a hypothetical consolidated mining operation in the area, and it turns out that it has a modest—substantial, but modest market value under our criteria. There's one new discovery of antimony on the west end of things, which was then one single outcrop, which had just been partically cleaned off at the time, but an obvious good discovery and with an obvious high grade of slate. However, there again, to exploit it, you would need new facilities, so the market value is there, but—under the criteria, but limited.

The Stampede area, there, as Chuck has said, there are obvious bets for additional ore in there. There—I've forgotten how many, I'd have to look it up, how many patented claims. There are about nine or something like that, patented claims. I've forgotten, and a number of unpatented claims. The geology again has been studied by the Government, is fairly well known and reported. It's a matter of somebody getting in there and aggressively doing exploration, putting in—there is some milling facility there. It would have to be reworked, but there is a possibility of a viable operation there and it is a substantial bet of a limited nature. It isn't obvious that it would be a huge deposit, but it would probably contribute a great deal of ore, similar to what's been produced in the past.

Coming around on the east side, there is—up Canyon Creek, there's—not Canyon Creek.

Unidentified Voice. Ohio?

Mr. Chadwick. Ohio Creek, up the head of Ohio Creek. The boundary at that time eliminated Canyon Creek and the copper deposits there, and the only thing within the then boundary that—in our study area, was one claim up the headwaters of Canyon Creek, with some tin greisen and I don't—I didn't see anything commercial there and I don't think the owners are necessarily proud of it. By the way, I'd like to say that in going through the area, I got cooperation out of every one of the owners that I could find and who was either on the ground or who I contacted before or afterwards, and they were free with their information and I had, you know, good cooperation from the—and, frankly, no pressure at all from anybody else as to my findings. Coming on down along the south, I think that the few properties that were down there were the placer property at Colorado Creek, the placer property on Treasure Creek, and whereas probably there was—from a geologic background, there probably were gold values in the creeks. There had been no operations of—no operations going on at the time and no past work, so that the value of these properties would be clearly nominal to—in the trade.

If I may, I'll just check to be sure I've run my gamut.

Mr. Harvey. Would you like to say something, Chuck?

Mr. Hawley. Yes. Again, the problem in this is that Mr. Chadwick was looking at claims only and he was looking at them as explored at the present time. He didn't address at all the types of deposits that we found to exist, the strataform deposits, and he didn't address any extensions. One example you just used was on the Ohio Creek tin greisen. Well, there's only one claim and as such, it has no value. But it's in the middle of a stock which has a pyritic tungsten bearing hill that's about a mile across and tungsten and veins in the adjacent canyon contain up to about 140 ounces of silver and 1.25 percent tungsten and quite a bit of other things, so that's a problem. If you're looking at a mining company, you wouldn't be looking at that one claim. You'd be looking at—

OK. You're going to stake one claim and then you're going to stake an additional hundred next to it and then you're going to negotiate and give the guy a price on the basis of this one claim or he's going to have a retained interest and there's got to be a better way to get at the value of these properties, if, in fact, there is a buyout.

Mr. HARVEY. Well, we're not—I won't argue with you at all, Chuck. We're not going to be misled by the fact that there's only one claim there. We know there might well be more minerals, and the other argument about acquisition appraisals is somewhat outside the scope of this discussion. Yes, Dave?

Mr. JONES. Just the definition of market value is the Supreme Court definition of market value, and if the National Park Service is obligated to purchase land, they're going to follow that definition. There's no other way to do it.

Mr. HARVEY. Yes, I know. I'm not quarreling with you, but I think that's really outside the scope of what we're trying to do here.

Mr. HAWLEY. That's right.

Mr. HARVEY. As to determining values. We're interested in the presence of the minerals and some idea, but in terms of—we aren't going to come away from this thinking that there's only $2 million worth of minerals in that area.

Mr. ANTHONY. But isn't it kind of a question where extensive buyouts can be proposed and if, in fact, the fair market price is paid, then people might be willing to sell, but they're not going to sell for 5 cents on the dollar.

Mr. HARVEY. Yes. It's a relevant—it's relevant, but not to what we're trying to do this week.

Mr. ANTHONY. OK. Yes.

Mr. HARVEY. OK. Yes, go ahead.

Mr. ANTHONY. What price is used for gold and silver on making evaluations?

Mr. HARVEY. Tell you what, if you're going to get into the issue of these evaluations, let's talk about it in another form.

Mr. ANTHONY. Well, I want to see just how good the data is.

Mr. HARVEY. My point is that, as far as we're concerned, it's irrelevant.

Mr. ANTHONY. OK. You're going to—you're not going to take the Park Service's buyout figure, then?

Mr. HARVEY. We're not here to take their buyout figure or even to think about their buyout figure. What I'm trying to find out is if there are any minerals up there and the answer is, yes, and I'm not that concerned about whether they're worth $1 million or $5 million.

Mr. ANTHONY. OK. Fine, I'll drop that question.

Mr. CHADWICK. Well, Mark, I—just to get out of the way or something, I've got 35 years in the mineral business and I've used what I think are, you know, the trade standards for prices and costs.

Mr. ANTHONY. You know, I really would like to tear into just how much detailed work was done in the evaluation, you know, because I gave you my reports and a lot of other people gave you their reports and these are old reports and I'd like to know how many samples were taken on the ground and if you sampled any placers and what-have-you, to really do a good job to come up with an evaluation.

Mr. HARVEY. This is really outside the scope of——

Mr. ANTHONY. It's outside the scope, but we're not going to accept the figure or accept all the figures.

Mr. HARVEY. No, no, I'm not—no, this——

Mr. ANTHONY. I want to put a lot more on the record.

Mr. HARVEY. Yes. No, we aren't here to even worry about what those numbers are.

Mr. CHADWICK. There's one area, if I may continue, there's one area that I did not cover and that is the dredge properties within Kantishna or the placer properties, and these are, of course, the properties which are viable today and which are being worked and as I saw them and evaluated them, almost without exception, those that were being worked on were profitable or at least supporting and with a reasonable overage for the season, beyond wages for all of the operators in there. There's also—we also took the approach, but in that country, there are a considerable number of streams which have not been tested for—like the rest of Alaska, have not been tested for their dredge possibilities and for bulk mining by dredge, and that certainly includes some of the streams in the Kantishna area. So we, hypothetically, constructed a couple of or a consolidated dredge scheme to get the maximum yardage and the least cost and evaluated that large dredge possibility, as well as the individual streams in there.

Mr. HARVEY. Is that it? Yes, go ahead.

Mr. HESSION. Jack Hession, Alaska Coalition. A question for Mr. Chadwick and other Park Service representatives here and perhaps for Mr. Tileston, BLM. That is, what has been the impact of the Kantishna mining activity on the lands and waters of this particular area?

Mr. CHADWICK. Well, if I can comment on it, I think temporarily, looking at any dredge—well, any placer ground. There is no dredge ground in there. Where their mining has torn up, but temporarily for the season, I think it's by and large that in that tundra country, the slopes creep down, the stream repairs itself and it's just like out on the Seward Peninsula, the Kougarok has been mined for 100 miles, I guess, and what—it's almost unnoticeable because the last mining was a considerable time ago, except where there are current operations in limited areas.

Mr. HESSION. How about the tundra portion? Perhaps I should note here that my own personal observation has been that there have been some severe damages to the tundra from cat trains crossing. I understand, not from personal experience, that Moose Creek has been pretty thoroughly churned up and that, in general, it's—if I may generalize—a mess. I think that should be part of the record here.

Mr. ANTHONY. Well, since we're adding to the record——

Mr. HARVEY. Go ahead.

Mr. ANTHONY [continuing]. It should also be pointed out that 20 or 30 years after placer mining, that becomes some of the best moose feed area in the country, and if you look at one of the old placer mining camps and the trails and what-have-you, I think you'll find some of your best game populations.

Mr. HESSION. Fine. How do you have the fish populations faring these days?

Mr. ANTHONY. Well, the fishing in Moose Creek is about the same as it has been for about 15 or 16 years. One thing that does happen is, the fish get full of food released from the placer mining above them. This makes it a little tougher to catch the fish.

Mr. HARVEY. Yes, sir?

Mr. FANKHAUSER. Mr. Chairman, I'd like to pursue the idea of mineral potential there, with a question to Russ and maybe—do you have any comments on the massive sulfide potential, particularly volcanogenic type deposits and maybe even shale hosted? In your—I realize you were only looking at specific claims and areas there, but——

Mr. CHADWICK. I think I know what you're speaking about, and I certainly—although I wasn't reporting on it and presumably not interested in anything else at that time, why, you can't help, as a geologist, noticing these things and some of the rocks certainly are extremely interesting, well mineralized and have—I don't think that possibility has been followed up at all, though.

Mr. FANKHAUSER. Yes. Mr. Chairman, I would like to pursue that point just a bit further. Massive sulfides in Alaska are just now beginning to come into their own. The Brooks Range thing and more particularly of interest to the committee here would be the massive sulfide deposits just east of McKinley Park in the Alaska Range, which has been found and pursued in the last 2 or 3 years, and the point being at this time is that this copper zone around McKinley has been waved around for some time and I agree with Russ that the market value of claims in particular holdings within this area does have a very low market value. No major exploration company is going to buy these out. No major exploration company is going to pursue the known favorable rocks or just the—they're just the type of things that are found in a day's drill and with good intersections just east of the park. The same geology occurs in the northern copper zone and to some extent in the southern zone, and while we're talking about market value and so forth, I thought the committee would be interested in knowing that those claims do go right up to McKinley and nothing else has been staked or located or done, of course, within McKinley, but potential for such is there.

Mr. HARVEY. Thank you.

Mr. ANTHONY. I'd like to address the hard rock potential of Kantishna a little bit. I'm speaking as the president of the Kantishna Mines, Limited, which is a successor to Red Top. We own 21 patented lode claims and 1 unpatented lode claim in the district, and our mineral deposits occur as fisher vein type deposits and they're rich, gold, silver, lead pockets. We have a long history in the district, varied with the economics of mining which, by the way, is getting rather good again. As the dollar drops, then the price of gold goes up. And we have the remains of an old mill there and we have a new mill, a small one, 35-ton Denver mill that is on our patented land, and we have 2 ore shoots that are small and they total about 5,000 tons of ore, each one is about half that, a total of—Well, one's a little bit more than the other one, but one has an average value of $250 a ton, which is very high for hard rock, and the other one has an average of, I think, $465 a ton in place, and we have other ore shoots there that need pursuing. But essentially what we're trying to is, you know, keep our act together and raise money and keep improving our mill and by running more mill cuts first and then expanding what we have. We need to think, we need to think deeper. We have a major fisher vein that goes through our property and we have values that start to approach Coeur d' Alene values and we have every reason to believe that these things being small on the surface, as we—if we're ever able to get down two or three hundred feet, why, we may have a Coeur d' Alene type situation in Kantishan.

Mr. HARVEY. Thank you. Any more? Yes.

Mr. WICKES. Yes. Jim Wickes, Department of Natural Resources. I'd like to comment very briefly on what our statewide resource assessment says on general area. Using the Andrus figure of 4.2 million acres within the Denali Park addition, we find some 2.9 million acres having some hard rock mineral potential and that substantially agrees with what you gentlemen have been saying, that it's a good—it's a potential area. In the top 20 percent, we find there are 640,000 acres within the addition that would rate very highly on a statewide basis.

Mr. HARVEY. Is that it? Any other comments on the hard rock? Yes; this gentleman.

Mr. SCHAFF. Ross Schaff, speaking on behalf of the Department of Natural Resources. I'd just like to add, as we did with the Lake Clark area, that since we did the 1977 mineral evaluations statewide, we have received a considerable amount of information from the mining industry. Some of it is proprietary and some of it since has been published which we will incorporate into the new studies, as we're presently doing, so within a couple of months, I think most of the comments and the pendings here will be incorporated into the State studies.

Mr. HARVEY. Anything else?

Mr. WICKES. Yes, Mr. Chairman, if I might excuse our absence, but we got a little bit—we missed out on mentioning the State's selection interests in the area. I think that might be an appropriate addition to the record.

Mr. HARVEY. Go ahead.

Mr. WICKES. Within this 4.2 million acre proposed addition by the Secretary of the Interior, there are roughly 270,000 acres of State lands. These are located primarily in the Stampede Road area, to the northeast of the existing park, and also in the southern—south of the proposed additions in the Chelatna Lake and Sunflower Basin area, some State selections. In addition, there are minor State lands, small amounts overlaped by the proposal, to the southwest there.

Mr. QUARLES. Did you say those were the existing parks, because I thought you were talking about the——

Mr. WICKES. Well, I'm sorry, northeast of the existing park.

Mr. QUARLES. Northeast?

Mr. WICKES. The Stampede Road area. In terms of State selection interests, the State has identified roughly 700,000 acres that would fall within the Andrus proposal. Generally, they lie to the north of the existing park, Pole Cat Drainage, in the southeastern flank in the Chelatna mining district and then some more to the south. The State is particularly interested in roughly seven or eight of those townships that we have identified. They're high priority.

Mr. HARVEY. Yes, sir?

Mr. DALE. The State also—I don't know if it has any value—maintains the airstrip at Kantishna, they call it Kantishna International. Yes, and they maintain it.

Mr. ANTHONY. That's in the years when the miners don't maintain it. The State maintains it more then they have.

Mr. DALE. The park became a park February 26, 1917, and Kantishna has been a recorded mining district since 1906 on the first belt and strike, right on the mouth of Eureka Creek. People mentioned historic values, it might have some.

Mr. HARVEY. Yes, Jack?

Mr. HESSION. To put Mr. Wickes' figures in a statewide context, I'm reading here from the State's own study. "Of mineralized lands in the top 20 percent, those within the proposed Denali addition are 1.849 percent of the significant lands of the State."

Mr. WICKES. You're referring then to a statewide total?

Mr. HESSION. Yes.

Mr. WICKES. I'll have to do some math, but I don't dispute that.

Mr. HARVEY. Any further comments on hard rock? All right. Transportation and access values or existing uses in the area. Does anyone want to start on that? Yes, this gentleman here.

Transportation and Access

Mr. THOMAS. Yes, I'm Bob Thomas, with the Department of Transportation and if I could, I'd like to talk a little bit about transportation in the area here. May I use the map up here?

Mr. HARVEY. You certainly may.

Mr. THOMAS. I'd like to start out by talking about the existing transportation facilities that are involved, both in the existing park and also within the proposed extension. The Alaska Railroad runs through the existing park and also the park's highway runs through the existing park. In the northern extension here, we have the Stampede Road corridor that is a State right-of-way. Also someone mentioned the Kantishna Airport is a State airport.

Mr. HARVEY. State right-of-way, but is there a road?

Mr. THOMAS. Yes. There is a road. It's not passible, except to four-wheel-drive-type vehicles, but there is a right-of-way acquired with that. There are—that's basically the existing transportation facility there. There is a proposed corridor, which I can show on this map back here, which actually starts in right about up here and comes and swings in here and goes on through and this corridor, this map over here comes down to the Bethel area. It's a very important corridor, one that we're doing some work on now, trying to identify just exactly where it should be. But it's the surface link to the entire lower Kuskokwim area here. As I pointed out yesterday, there's a—or Monday I believe it was, there's been tremendous opportunities to save a lot of energy as far as fuel goes. Also whether that is economical at this time, it's beginning to be quite marginal toward being economical, because of the high cost of fuel and also because of the high cost of the shipping into that area by boats. For instance, well, I should point out that Alaska transportation systems have developed some problems. It's catch-as-catch-can, and people seem to do whatever the most economical way is. Right now, the entire supplies, the entire stocks that can be shipped in by parcel post is being mailed in to stores. An example is in the Stebbins area, it costs $3.50 to ship a case of milk in by postage and $8.50 by air freight. If the U.S. Government should change their leniency on this type of thing, it would immediately change the transportation picture in that area and make a lot of things economical that aren't economical now. Another example is in Barrow, it costs about 3½ cents a pound to ship in by air parcel post and the airlines get about 12 cents. This is the type of thing that doesn't show up in studies, but as these things change, it makes a big difference.

Mr. HARVEY. Are you saying that if the Federal Government stops subsidizing the transportation, then the State—it will make it economical for the State to build a road? Is that——

Mr. THOMAS. No, I'm not saying that.

Mr. HARVEY. OK.

Mr. THOMAS. I'm just saying that what the Federal Government may do could make it economical. We would have—the problem is, as a State, we're faced with trying to serve people and right now paying the upper limit they can possibly pay and still survive in that area, and if anything happens to upset the apple cart, the State's the one that's going to have to solve the problem. These are the—one of the corridors we've identified is a very important corridor and I think it should be retained. One of the reasons is the one we're so near here—close to Wonder Lake, is as many people pointed out earlier in their testimony, is the view of McKinley here. As you know, many of the tourists, in fact, most of the tourists and many of the Alaskans that visit Mount McKinley Park do so simply to see the mountains and I think it was brought out several times this morning that the wildlife along the existing road back to the mountain here is also of tremendous value. I've been over this road many times and I agree with that, and I also know that you could not improve that road to handle the type of traffic and get people back to see that mountain, although sometimes that's their primary purpose in coming to Alaska and coming to the park.

When we were first looking at this corridor, one of our ideas was that whether this became a railroad down to the Bethel area or a highway down to the Bethel area, that it would be possible—at this time, this was all heavily State selected—to develop some sort of a setup here where people could view that mountain and that would allow people coming down through a good access road, one that could be built to good standards and kind of headquarter here, and then the park could retain this interior road here, which could not be upgraded and if you did, it would compromise the scenic values and also the animal wildlife views that you get along there. They could retain that, and as you know now they just run buses back and forth. They're not allowed back here with private vehicles, only on special occasions. But they could retain that corridor as a wildlife tour and they could allow everybody to come to Alaska and see the mountain, and I think that the mountain belongs to the people of the United States. It belongs to the people of Alaska, and I don't think you're going to wear it out by taking pictures of it, at least along in the near future. So that was our primary reason for moving it over here. Another reason was, it did get on the good soils on the outwash here. As you get down here toward Lake Minchumina, the road building becomes pretty tough, but as long as you're on the outwash, the gravel outwash, it's quite good.

Mr. JONES. That proposed road would just about double the length of the placer mining season in the Kantishna, it would cut our freight costs about in half. And it would get the Park Service off our backs, just to have that road.

Mr. HARVEY. Thank you very much. Are there any more comments on transportation and access?

Mr. JONES. On access, I think I should state that the legislation I have seen provides that any park or wild river or game refuge will come under the mining and parks bill. This means that regulations have been promulgated, published in 36 CFR, part 9, which would say, in a sense, that it had to be done by a plan of operations being approved by the Superintendent. I think you'll find that in the existing claims, wherever it has to cross Park Service land for access.

Mr. BEVINETTO. Mr. Chairman, I've got a question for Mr. Harry of the Park Service and the question is for information only and should not be construed as a request for a definitive policy statement. I don't intend to resolve anything here, but to have information for the members of the committee. In the National Park Service areas of Alaska, what are the general requirements for parties or persons interested in gathering geological data to enter, collect, drill or otherwise explore for minerals, including oil and gas, in the area or areas outside where the formation carries into the National Park Service area?

Mr. HARRY. It's illegal to prospect within national parks. There's a Mining and Parks Act. However, frequently we have common interests in the geological knowledge that geologists looking for oil or for minerals or for us looking for knowledge to interpret the geology of a park, we have a common data base we need, and over the years in the Service, we have at times been able to meet the common ground that we were able to get that knowledge without violating the law against prospecting within the park, and yet people who needed the data got the data. Those—the criteria that had to be met generally are, first, that lasting surface damage should not be done to the park; second, that people that come there who wish to gain experience in wild lands should not—should not have that experience impaired, so it should be at a time of the year when—or at a place where people aren't; and third, that the information generated should be common public knowledge and in the last one is the one that often causes the bind. But as a matter of fact, in the last couple of years, we have granted virtually every request for surface sampling within parks in Alaska. We have not granted permits to drill. Some of the cases that we have denied within the past 2 years, for example, Chuck, when he was doing his study was, frankly, based on the knowledge that the parks—or the mining and the parks bill close to passage, that a flurry of claims had encumbered us for a long time and I was advised that permits should—it would be really poor policy to issue the permit. But then the same year, we did issue permits in Katmai, Glacier Bay and McKinley Park for surface sample taking.

Mr. BEVINETTO. Thank you.

Mr. ANTHONY. How many requests from private companies have you had in the last year to do sampling in the park?

Mr. HARRY. I'll supply the material. We mostly had requests from companies that peripheried Katmai. Most of those have been granted. We have not granted permits to drill.

Mr. ANTHONY. But would you think maybe it would be close to zero?

Mr. HARRY. McKinley, until the passage of the Mining and the Parks Act, was open to prospecting and no permits to prospect prior to that time were denied.

Mr. ANTHONY. Well, how many were there over a, say, 10-year period?

Mr. HARRY. Prospecting has taken place in claims——

Mr. ANTHONY. But within McKinley, you had to register with the Superintendent?

Mr. HARRY. You had to register, but none were denied.

Mr. ANTHONY. But I mean, there were very few of them?

Mr. HARRY. Oh, no, there have been recent prospects. In fact, there are—there were a flurry of prospects in Glacier Bay that were recorded the day before the mining and parks bill was enacted.

Mr. ANTHONY. I'm not talking about Glacier, I'm talking about McKinley.

Mr. HARRY. Well, maybe I don't understand your point then. Prior to the——

Mr. ANTHONY. I'm asking how many permits you issued?

Mr. HARRY. Prior to the Mining and the Parks Act, all the individual had to do would be to register that he was going out, so the number depended, then, solely upon the individual's initiative, rather than any action by the Park Service.

Mr. ANTHONY. No. But I mean, I'm trying to find out how many mining companies actually did go out in the park and prospect?

Mr. HARRY. Oh, very few.

Mr. ANTHONY. Right. And as to the Glacier Bay National Monument, it was open for prospecting?

Mr. HARRY. So was McKinley.

Mr. ANTHONY. Much to our regret, there's good mining in there that was knocked off.

Mr. HARRY. But McKinley was open on the same basis as Glacier Bay prior to September 27 of 1976. It became closed, then, with the passage of that act.

Mr. ANTHONY. Yes, I realize that closed it completely. Now, the extension of McKinley, it will effectively close the mining there.

Mr. HARRY. I'm not——

Mr. ANTHONY. Unless there is extenuating language, you know, based on the present act.

Mr. HARRY. The present—there are many proposed languages and those——

Mr. HARVEY. Let's assume, let's just ask a question for the record, and that is, assuming that there's no special language at all and the area that has mining claims comes within the park boundary, what then is the legal situation with those claims?

Mr. HARRY. If the lands were not open to new entry, we would have an opportunity to try to purchase on a willing-seller-willing-buyer basis. If the lands were open to further prospecting, it would be futile to try to buy out the——

Mr. HARVEY. Well, let's assume that you just have the existing rules applied, just by a simple extension of the boundary.

Mr. HARRY. OK. Then reasonable access, based upon a management plan that would not do undue harm to the environment, would be required by law. We would have an opportunity to negotiate on a reasonable-buyer-reasonable-seller basis, and if we could get a common ground and had the money, perhaps we could buy out some of the landholdings. If not, for example, it's probably impossible to buy out the Numont Mining Co. claim at Brady Glacier, although we've approached them.

Mr. HARVEY. Yes?

Mr. SILVER. Just some questions. Under the Andrus proposal, the right-of-way for the Alaska Railroad would be included in the park; is that correct?

Mr. HARRY. That's right. At the present time—we don't publicize it widely, but at the present time, it isn't a right-of-way, it's just that the railroad, itself, is not in the park. There's park on one side and a park on the other side, so that if you want to break a law, the ranger can't get you there in—along the railroad tracks.

Mr. HARVEY. We'd like to correct that. Any more comments on access? Yes, go ahead.

Mr. MORGRIDGE. Dean Morgridge, Alaska Oil & Gas Association. I have a question for the Park Service. What would be the conditions or the requirements for entering either McKinley or Katmai for the purpose of collecting geological samples?

Mr. HARRY. Today, it would be virtually impossible, if it were construed that you were prospecting. We have been fairly lenient with the granting of permits for collection of specimens. For example, to make a geologic map or to learn the geology, which we need in the management of the park, if the data would be shared.

Mr. HARVEY. But suppose a situation, though, just for my edification, where the oil and gas people have mentioned several times where they would like a chance to examine, let's say, the land within the park so that they could get better—make a better judgment about oil and gas potential of lands that are not within the park?

Mr. HARRY. I think the situation is, frankly, more polarized today in black and white, so it's because of the controversy, but I'd say that in general, you'd have difficulty with motorized access in places that are wilderness. You would not have difficulty with the collection of surface samples. It would be extremely difficult to grant you a permit to drill.

Mr. MORGRIDGE. Dean Morgridge, IOGA. There wouldn't be any problem with going into the park and collecting surface samples, fist-sized samples, which we would then carry out with us for purposes of determining the geochemistry, the source rock potential, the rock quality?

Mr. HARRY. Well, I probably would weasel on the collecting permits or write down the purpose. I, frankly, would say that the purpose was again geologic knowledge. We are interested in that. We'd like to have a popular geology of the McKinley Range.

Mr. MORGRIDGE. And we have always——

Mr. HARVEY. Were you finished?

Mr. HARRY. Yes.

Mr. MORGRIDGE. When we have been granted any kind of a permit that allows access into these either monuments or parks, we have always returned our field notes over to the Park Service.

Mr. HARRY. We have easy mechanisms for the granting of scientific collection permits.

Mr. MORGRIDGE. Now, that's my point. We have found it very difficult to get permits.

Mr. HARRY. Then it's——

Mr. MORGRIDGE. And now if I worked for the University of Alaska, if I worked for any public institution, there would be no problem, but because I am employed by a private company, it's very—it's been very difficult for us to get meaningful permits. Now, you might—you'll grant a permit, but it will be conditioned in such a way that, you know——

Mr. HARRY. Frankly, I've had problems——

Mr. MORGRIDGE [continuing]. That you won't be able to do it.

Mr. HARRY. Franky, I've had trouble with many of the companies in getting the information that most companies request, seemingly so heavily and that their information is their livelihood and they're reluctant to share that, whereas the universities, the information is freely dispatched.

Mr. MORGRIDGE. Well, I think if you'll look in your files for the Katmai Monument, you'll find several complete field notes.

Mr. HARRY. That's true.

Mr. MORGRIDGE. And in some cases, geologic reports that were submitted to the Park Service by private oil companies. But this was one of our real problems prior to the lower Cook Inlet OCS sale, is getting access, reasonable access, to the Katmai area. That whole section that is prospected offshore is exposed there at Cape Douglas, and I couldn't even get a permit. We could land on the beach with a helicopter. I tried to get permission just to let the helicopter let me off on the top of the sea cliffs there that are quite steep and I could walk down the cliffs and——

Mr. HARRY. You have two questions, though. You have one question of granting of a scientific permit to get surface samples. Another question of landing helicopters within an area that falls under the 1964 Wilderness Act that states we manage as wilderness until the Congress determines how that is, so that in the wild areas, we do not allow helicopter access in lands that are potential wilderness, and we're—you know, quite frankly, we don't break the law, knowingly, and that's what the law states.

Mr. MORGRIDGE. Yes. Well, it was my understanding you couldn't land a helicopter to conduct these operations, whereas you stated earlier it was going to compromise the wilderness experience of visitors to the park.

Mr. HARRY. That's right.

Mr. MORGRIDGE. And this was not the case in the area in which we were——

Mr. HARRY. We are only allowed to use helicopter landings within wilderness or potential wilderness prior to the passage—prior to its evaluation by Congress, to use helicopter landings for management purposes. That's how we operate. We operate ourselves in that manner, too.

Mr. HARVEY. Are there any more comments on this access and transportation issue?

Mr. ANTHONY. Yes, we want to talk about transportation through the park right now, don't we, Jim?

Mr. HARVEY. Go ahead.

Mr. DALE. The road was—like, they had some kind of a trail in 1906 before the park. The point I want to make is, we have a real problem getting through the park. Our hours are limited to such that it takes us 3 days. It's about 90 miles through the park, roughly. We've got a truck and a lowboy and a cat. You can only go 35 miles an hour, that's the speed limit of the park. To travel that 90 miles between the hours of 11 at night and 6 in the morning, you don't have time to unload and get back out of the park to get another load, so it costs us 2 to 3 days because of the hours, and I'd like to make reference to their bus drivers. They've got kids, I don't know, maybe they're 18. They don't look it, you know, and they're packing 30, 40 people around over those passes. They're taking their half right out of the middle and I'd be scared to death to ride one of those buses, you know. Yet we're restricted, we can't even take a small pickup with a flatbed on it. You know, I'm talking about a three-quarter ton truck with a flatbed. We can't drive through the park during the day with that or with groceries and I think that as long as we're able to mine in Kantishna, we should be given a little more lenience, because we drive the road—I've driven that road 50 times and I don't think there's even been an accident with a miner. Now, I might be wrong, I'd have to ask somebody, but last year and the year before there wasn't, that I know of, and if they run some of their buses over the cliff, you know, it's not us doing it.

Mr. ANTHONY. And they have done it. The buses are oversized for the road. The road is continually deteriorating under their management. It's—the west end of the road is out——

Mr. HARVEY. What you're advocating is commercial access on the park road?

Mr. ANTHONY. That's right. We have a right to access. It's our lifeline in the Kantishna. They leisurely plow beyond Eielson Visitor Center as they please and when they—they usually follow us through the park to make sure we stay under 35 miles an hour, and we're about the only ones that do when there's open stretches, and there are a lot of places where you only want to drive about 10 and even that is brave. But we really get hassled, we get interrogated for a permit if we want to go in there.

Mr. DALE. Another thing is, you know, they have several gates and they'll lock the gates and there's nobody around. You show up at 2 o'clock in the morning and you've only got 4 more hours to get to camp and the gate's locked, what are you going to do? You know, you're 35 miles from anywhere, driving a truck. You can't hardly turn around to go back to the gate at the beginning and so the only alternative is to break the lock, you know, and you go on through. Now, I know that's wrong, but it's wrong to sit on the park. If you're there during the day, like, I had a flat tire and I don't know how many times the rangers came by and hassled me about having a flat tire and having to sit on the side of the road, you know, during the day, during the hours I wasn't supposed to be on the road.

Mr. HARVEY. All right. I think we've got a picture of the problem.

Mr. DALE. There's more to it than that, but we'll stop.

Mr. HARVEY. Yes?

Mr. ENGLE. Yes. I'd like to make a little brief statement about access for professional hunting. I think it's essential that the piece of legislation spells out access in here. It's not that I don't trust the Park Service, but if it's left up to them to put the regulation in, I'm quite aware of regulations, since I'm part of the Guide License and Control Board and make some of those Mickey Mouse regulations here in the State. I try not to do this, but it happens once in a while, and I feel that the Park Service and the Interior Department, the—if the wrong man got in the head of the Interior Department, such as Mo Udall or someone like that, we'd all be out of luck. This must be spelled out in the legislation, access in the area. Possibly specific access, maybe not pinpoint the areas that a person could land with a Supercub, or a smaller engine aircraft like that. You land on a sandbar, one rain and a good wind and, hell, you'd never see that the man's ever been there. I realize you run a D–8 Cat across there, why, you know, it leaves it a little bit longer, but I think this is essentially what the professional hunters are very uptight about, is access into lands that they say they're going to allow hunting in, and again I think that should be specifically specified in there, that the hunting will be allowed, not at the discretion of the Park Service.

Mr. ANTHONY. Our airstrips are important for access, because—you know, because of this road problem. Of course, our key airstrip in the Kantishna area is the Moose Hill strip, but there are a number of other strips in there also.

Mr. HARVEY. Thank you. Did you have a comment?

Mr. HARRY. The conflict on the roads is real. I'd like to comment that the purpose of the road, in our view, is for park visitors to see scenery and to see the wildlife. The Park Service maintains the road, we built it. Most visitors that come to Alaska see wildlife along that roadway. If you change it to a commercial road, we believe would chase away the things that people come to see, the wildlife, and our studies show that, that caribou, that grizzlies are incompatible with modern highways. Count how many such animals you see along the parks highway and how many you see along the McKinley Park Road, and the use of the road has increased enormously. In 1971, 73,000 people, visitors to the park, visited the park on that road. I don't have 1977 figures, but in 1976, 130,000 people visited the park along the road and frankly, we don't believe that the road can be rebuilt to modern Federal highway standards and still have grizzlies and caribou. We don't believe it can stand the traffic that everyone wants on it and still be a reasonably safe road.

Mr. ANTHONY. That road was built for access to the Kantishna mining district, just as well as for use by the park, and our rights have been made secondary by the Park Service, arbitrarily. The Park Service doesn't try to maintain a traffic pattern through there for its own vehicles. You send your heavy vehicles through there any time you want to, but you always restrict ours.

Mr. DALE. That's right.

Mr. ANTHONY. And on the subject of visitors to the park, is this cable the one that you people had on the Fairbanks/Anchorage Highway for counting, or is this a cable that you had on the Kantishna Road?

Mr. HARRY. The figures I gave to you are the number of people on the Kantishna Road: 56,000 people visited the road by their own private car, 24,000 visited by the concessions bus, 48,000 visited by the shuttlebus. The rounding of the figures may not come out the exact figure.

Mr. THOMAS. Yes. I'd like to state that the State of Alaska shares the park's view that that road should not be upgraded. It just—it goes through some very rugged terrain and I also share the view that it would destroy the wildlife and the scenic, and that's, I think, been demonstrated here that there is a need for access into the area and also on down to Bethel and that's why we're proposing north in that northern extension, that it would be easy to build roads.

Mr. HARVEY. Are there any other comments on this access? Yes?

Mr. EPPS. I think you know, along this—we're talking about—Alan Epps, Cooperative Extension. We're talking about—as long as we're talking about regulations and access issues, one of the things that is very rarely addressed, and we're talking about this (d)(2) issue, is existing FAA regulations, which have limits on how high or how low to the ground one can fly and specific landing sites within designated parks and refuges. Here's another agency that writes regulations that may influence these things these gentlemen are talking about that are completely outside of the Department of the Interior and I just wanted to bring that up at this point.

Mr. HARVEY. Thank you. All right. As I said, we'll conclude on Mount McKinley and take about a 5-minute break and start on the Kenai.

[A short recess was taken.]

Mr. HARVEY. The workshop will come to order. I believe, again, our consideration of a group of proposals that center around the Kenai Peninsula, on or near the Kenai, anyway. We'll see how far we can get by 5:30 and if we're not finished, we'll simply resume with that tomorrow morning at 9 o'clock and at that point, then, proceed to the Wrangells and as part of that, we will consider the additions to the Chugach Forest that tie in, physically, much more closely with the Wrangells. I'm going to ask Dick to kind of define the areas we're talking about here and then we'll open it up.

KENAI PENINSULA

Mr. STENMARK. Richard Stenmark, Land Use Planning Commission. The areas we want to address during the remaining part of the day will be those that are basically proposed for addition to the Kenai Moose Range, one area, the—part of the Chickaloon drainage here, out of the existing national forest. In this area, another area of lands, public lands down in this area to the south of the Moose Range, what has been variously proposed as a park or a monument in this area, the Kenai Fjords, Harding icefield area, and additions to the Chugach National Forest that were left out of the original forest reserve, the upper Nellie Juan area, part of the Sargeant icefield, and the upper College Fjord and Harriman Fjord area in here. That concludes my remarks.

Mr. HARVEY. Thank you, Dick. We'll turn first to the scenic landscape values and so on. Who would like to start that off? Go ahead.

Scenic, Landscape, Historic, and Archeological Values

Mr. GORDON. Are you talking specifically about the Kenai Fjords?

Mr. HARVEY. Covering the whole thing, any and all of it that you would like to address.

Mr. GORDON. I'll just make very brief points on the other areas and then talk primarily about the Kenai Fjords. The Big Indian drainage, which is the addition on the northeastern corner of Kenai Moose Range, I don't see any Fish and Wildlife people at the table, so I'll mention it. This is the completion of a drainage which is partially in the refuge now. It is also probably the outstanding wilderness quality, small drainage in the, if you will, central recreation focus, mountain valley portion of the Kenai Peninsula. It's the least disturbed of all those valleys. I'm now talking about a very small drainage. It drains into the Chickaloon Flats, which is a major waterfowl staging area, and that's why it's being added to the refuge. The one thing I'll mention about the College Fjord area is that of all the fjords in Alaska, this one best exemplifies, because of the stability of the ice front, the relationship between a rather sheer-walled fjord with many glaciers coming into it, and in the areas that have not been recently covered by glaciers, a fairly mature spruce forest. In other words, you have the visual combination of this dark green spruce forest right up against the ice and that is a rather unusual feature.

To turn to the Kenai Fjord system, the Kenai Fjords are probably the classic textbook example, the outstanding example in western North America, of an intricately dissected drown mountain coast. Now, all that means is that while there are many fjords in Alaska and they're all pretty, the characteristics of the fjord coast is that because of the changes in land figure relationships, the sea is higher up in the fjords, if you will, than in most places. You actually have cirques that are drowned in sea water. The topography has been called biscuit board topography, exceedingly dissected, many, many islands, many narrow necks, just a few feet or tens of feet wide. The scale of these fjords is smaller, more compact. In a way, it's analogous to the Grand Tetons, as compared to most of the mountain ranges in the Western United States. The relief, the contrasts within this reduced scale are probably as great and dramatic as any fjords in Alaska. In other words, the elevations aren't as high, but the walls are just as steep. The fjords aren't as long, but they are much narrower. The turfs are not as big, but they have just as much of the quality of a rounded rim of rock going vertically. The—even the necks, where they're only a few hundred yards wide, they're very often sheer rock to dry, separating the inlets for five hundred and several thousands of feet. In other words, it's a scale which is much smaller than most of the other fjords in Alaska, but the degree of relief and the contrasts between the glaciers at the head, the relief of the side walls is—and the narrowness of the inlet is at least equal in quality, if not more than equal in quality, visually to any other fjord, and the degree of scalloping is the best example of this, the most outstanding example in the State. It's a feature of very much national significance. That's all I have.

Mr. HARVEY. Thank you. Incidentally, Dick reminds me that we missed one of these areas that—in our definition of our subject here, and that's the proposed wilderness designation in the Nellie Juan area. We're also interested in comments on that.

Mr. LAVENE. Mr. Chairman?

Mr. HARVEY. Yes?

Mr. LAVENE. Dave Lavene, with the Alaska Coalition.

COURT REPORTER. Pardon?

Mr. LAVENE. Dave Lavene.

COURT REPORTER. Why don't you move closer to a microphone?

Mr. LAVENE. Dave Lavene, Alaska Coalition. It was my understanding that you were going to be going through these one by one, rather than taking the entire region as a whole, and one our resource experts is going to address the wilderness proposal in the Prince William Sound and he isn't here now. Could we submit that for the record or briefly cover it tomorrow morning?

Mr. HARVEY. I expect that we'll still be on this tomorrow morning anyway.

Mr. LAVENE. OK.

Mr. GORDON. OK. I guess I was confused. Our wording should include the wilderness proposal in the sound?

Mr. HARVEY. Just that one, I think.

Mr. GORDON. Well, the Nellie Juan addition.

Mr. HARVEY. Yes.

Mr. GORDON. I'm sorry. I didn't understand you.

Mr. HARVEY. OK. I realize you didn't, because Dick forgot to say that. Do you want to make a comment about it?

Mr. STENMARK. Yes; let me add, in addition to the fjords which are well known, probably the major concern we have in the sound is not these ice fields and fjords, which are magnificent, but they're not particularly pressing. The proposal includes a number of islands in the sound, of various sizes. The islands are of moderate relief, but with a great deal of bedrock outcropping and again, long narrow harbors, chains of stairstep lakes, that is, where one lake has been carved out by the glacier at a particular elevation and is connected by a waterfall to the next lower lake and you have a series of these lakes. The Nellie Juan and Misty Fjords areas are probably the two best examples in—certainly on the coast of this type of typography. One island, in particular, deserves mention, because it is in conflict. There's copper potential on it. There is also what is considered to be the outstanding island scenery is all of Prince William Sound, and that is Knight Island. The proposal of the Alaska Coalition is to include the northern half of Knight Island, in order to try to avoid as much as possible the mineralized conflicts. However, the entire island has a character of what is called pillow lavas. These were lava rocks that were extruded under the sea and they have a very distinctive peculiar bumpy pillowlike form. Knight Island has a great deal of exposed bedrock and it's almost completely dissected by fjords. The amount of coastline for its acreage is greater than any other island in the south, so I wanted to emphasize the particular topography characteristics of the islands in the sound. The timberline on the sound is—the Western Sound, particularly—is lower than elsewhere along the west coast, so you have the visual experience of going through these passages, with the dark fringe of timber, just like southeast Alaska, but there's a great deal of more luxuriant, what I call muskeg, you can call it tundra if you like, which is a very luxuriant moss, sphagnum edge in summer, early summer, flower-filled community, which comes almost down to sea level and interfingers with the pieces of forest and rocks to give a somewhat more—what I am trying to say? Piebald appearance, intricately woven appearance than most of the similar areas in southeast.

Mr. GRAHAM. Mr. Chairman?

Mr. HARVEY. Yes?

Mr. GRAHAM. Hatch Graham of the Forest Service. Just adding a little more to the scenic values that Richard so well described, the College Fjord addition, by agreement with the Bureau of Land Management, is in the Administration's proposal up to the crest of the watershed behind the Prince William Sound area. The College Fjord addition, then, would go to the top of Mount Marcus Baker, which is over thirteen thousand feet, on the crest of the Chugach. Some tremendous scenery from the standpoint of rocks, glaciers, icefields, the backdrop is the very scenic Harriman Fjord and Columbia Glacier areas that are already on the Chugach Forest. The—there are also highly scenic viewing opportunities for wildlife and I'm sure the wildlife will be covered more thoroughly later, but marine mammals, bald eagles and a number of other excellent viewing opportunities in the total Prince William Sound area, as well as the College Fjord addition. The Nellie Juan addition is largely the Sargeant Ice Field, but the headwaters of the Nellie Juan River, part of which has Native selections on it, is also in that addition and is an integral part of the watershed picture there in the Prince William Sound area. Clay Beal was Forest Supervisor of the Chugach Forest in here and will handle some of the other details of this as we move on past the scenery.

Mr. HARVEY. Very good. Any other comments on the scenic and landscape values?

Mr. FOLLOWS. Mr. Chairman, Don Follows, National Park Service, and my comments are primarily directed to the Kenai Fjords area. In 1968, the National Park Service had a natural landmark study, trying to identify the last larger remaining icefields in the United States and out of that study came the identification of three remaining named ice fields in the United States. Those three were the Bagley Ice Field over in the Saint Elias Range, the Sargeant Ice Field west—east of Seward, and the Harding Ice Field, west of Seward. The Harding Ice Field, itself, is the key to understanding the College Fjords and the total environment there. Actually it's an area of dynamic change where the geologic processes are still carving a landscape. The Harding Ice Field, itself, is over 700 square miles and it sits on top of the southern Kenai Mountain platform, at roughly 4,000 to 5,000 feet in elevation. Radiating out in all directions from that ice field, which is two words, not one, are some 32 glaciers and some of these glaciers spill out on the dry land, some spill out in the ocean. We have every conceivable type of glacial terrain and glacial feature that you can find in one system. Twelve of those glacers fall within the Kenai Fjords proposal for national park, and five of those cab directly into the saltwater, much like Columbia Glacier and some of these. The ice field system, itself, is one of five scenic elements to the proposal. The ice field at the top portion where you have actually a Pleistocene landsape. If you want to step back and find out what it was like 20,000 years ago, go up to the northern end of the Harding Ice Field, and the fossil climate there is pretty much what it was at that time. You have crevasses, ice falls, you have nunataks, which are mountain ridges sticking up out of that icefield, tremendous expanses of ice and snow, which is still occupying its original position from past ages.

You also have, at the northern end of the unit, a valley and Resurrection River Valley which has been free of ice for probably, I would just guess, maybe a couple hundred years. At least for a long enough period there to allow regrowth to take place, to have a miniature rain forest and some of the vegetation and scenery which is in a classical U-shaped valley. Take that U-shaped valley and flood it with the ocean and you have the fjord down on the southeast portion. Another portion of the scenic interest, of course, is the Harding Ice Field, which on the southeast coast in the area we call the Kenai Fjords, these glaciers, valley glaciers are receding back and many of those have come back in the last generation of time. 1904, 1905, U.S. Grant and Higgins went down and made the first reconnaissance of that coastline and they actually mapped the ends of several of those tidewater glaciers, so that today a scientist could go in and reestablish how much recession had taken place on the face of the ice. The McCarty Glacier, for example, that one has retreated back about eighteen miles since 1905. Northwest Lagoon, that's dropped back many miles also, so you have an area then which is being released from the ice and so scoured shorelines, the remnant forests of Sitka spruce are in there, very small, maybe 100, 150 years old, mature growth. But most of the forest was scoured off by these glacial advances that migrate up and down on this fjord. Then you have some very scenic coastal features which are part of the fjords, themselves. A fjord is simply the seaward end of one of these glacially ground valleys and out in these ends of those, you have these island rock peninsulas, you have some Tertiary granodiorite rocks, which are really the very fingertips of the fjord basins, themselves, and a lot of those are tree studded, with Sitka spruce growing right out of the granite.

A lot of them later on, we'll find, have significant wildlife populations for portions of the year, but we also have a lot of coastal features. The Chiswell Islands are seastacks which are being beaten by the north Pacific. They are erosional features that are being rounded down, the most hard element, that granite, is the last to survive. We have sea arches, we have sea caves, pinnacles, a great many features along that sunken coast. The sunken coast is the key to understanding the fjord also, because the Kenai Fjords are eight deepwater, wave-beaten fjords, unlike the fjords in Prince William Sound, which are fjord estuaries. These are exposed to the full onslaught of the winter storms off the gulf, and because of this erosion and because of the sinking coastline, there are very few beaches or places where you can land. So the coastline, then, from really Port Dick to Resurrection Bay is the Kenai Fjords. these are the deepwater fjords of that system and they all relate to the Harding Ice Field on top, and to an ancestrial icefield which existed there probably 70 years ago. There's evidence, recent evidence, that probably Ice Worm Peak down in the southwestern portion was connected to the Harding Ice Field 60 years ago. We have a map dated 1915 which shows it as one piece, a 1915 map which was the first U.S. topographical map made of the Kenai Peninsula by the U.S. Geological Survey. So it's a total system of ice field fjords and then one other scenic feature we don't want to forget, and that's the one known only to skindivers that have gone underwater and have actually looked at the fjords. I understand from the slides I've seen, it's a fairyland of oranges and purples and colors and sealife that have reallly been untouched and pretty much unspoiled in there. Thank you.

Mr. HARVEY. Thank you. Are there any more comments on the scenic, landscape values?

Mr. SILVER. One question. Senator Stevens has a separate piece of legislation with respect to the Seward National Recreation Area. Can somebody tell me what the overlap would be between his legislation and the Harding Ice Fields/Kenai Fjords National Monument?

Mr. STENMARK. Richard Stenmark, Land Use Planning Commission. The proposed Seward National Recreation Area would basically be carved out of the existing Chugach Forest here. In the watershed west of Prince William Sound, that is, the watershed coming back into Turnagain Arm, down toward Seward and over to the boundary of the Kenai Moose Range. There is an overlapping area of interest on the south where the NRA proposed to come up to the edge of the Harding Ice Field. This northern edge is of particular interest, coming out of Resurrection Valley, because it's basically the access point to the edge of the icefield. Near one of the glaciers that comes out of the field called Exit Glacier, there is an opportunity there to perhaps build a tramway up to the edge of the icefield. Once on the icefield, it's relatively crevass-free, and as Don mentioned a minute ago, if you want to see Seward's "icebox," that's the place to get the feeling, or the feeling of the past. Does that answer your question?

Mr. SILVER. That lays the record for my next question, which is a question for the Park Service. Does the Park Service consider a tramway as something that would be compatible within its management plans for the monument within that area, since there is an overlap between what would be national forest land and the Seward National Recreation proposal and what would be the Harding Ice Fields/Kenai Fjords National Monument under the Andros Proposal?

Mr. FOLLOWS. If the area's established transportation studies would be done and it would be a little premature to say what the best type of system would be to get people up there, but the main concern would be for the impact on the environment and to try and divide the system whereby heavy impact would not take place. We do feel, however, that is important to get visitors on the icefield.

Mr. HARVEY. Are there any more comments on—yes, sir?

Mr. RICHEY. Bob Richey, Fish and Wildlife. I'd like to further comment, perhaps, on the northern and southern extensions to the Kenai National Moose Range and first on the northern extension there. I think we should point out and make it clear that that addition to the refuge there would then fully protect the entire watershed that dumps into that Chickaloon Flats and is very important as prime waterfowl habitat, primarily in the mud flats—during the migration in the spring and again in the fall, as well as their production area there. In addition to that, it is a natural area, relatively undisturbed. It rises right out of the tidelands and within a quarter mile on some sections, up to about 4,000 feet, passing through treelines into a tundra area. It's without glaciers and it's extremely scenic and as one gentleman here pointed out, it does have—and I'll point out a little later—extensive wildlife values there.

From the ridges and the alpine valleys that do drop out of that area to the east into Resurrection Creek, there's some tremendous views. In flying over the area and on the ground in the area, I've—you're able to see the entire Anchorage Basin, Cook Inlet, the western half of the Kenai Peninsula, the eastern and end extension of the Aleutian Range, the vast Susitna Drainage, and from that point, the Alaska Range and Mount McKinley. As to the southern extension, between Kachemak Bay and Nuka Bay and the west and east arm of Nuka Bay, there is a break between the Harding Ice Field at Dinglestadt Glacier, working south, which is now the refuge boundary. There is a vast icefield there. It's typical of the Harding Ice Field, only much smaller in size, but it does have some very spectacular glacier arms that leave the icefield and have a very steep gradient into the Glacier Bay side. It's a very captivating scene, both from Homer and from the east road out of Homer and I'm surprised that someone hasn't already mentioned that, but I suppose it would have come up a little bit later. It also is extremely a natural area and very scenic.

Mr. FOLLOWS. This is the area, sir, that I was referring to as the ice-formed peak area.

Mr. RICHEY. Was it? I'm sorry. I missed that.

Mr. FOLLOWS. As part of that total icefield system there.

Mr. RICHEY. It is, yes.

Mr. FOLLOWS. Very scenic.

Mr. RICHEY. Thank you.

Mr. BEAL. One—Clay Beal with the Forest Service. One last thing on the scenic values. The Forest completed a rather broad gage management plan in 1974 for the Chugach Forest and in it, it identified three specific areas in the Prince William Sound area as being—having these kinds of values, one of which was the Nellie Juan study area which includes much of what has been proposed and it also includes that portion of the Chugach National Forest addition there, the Sargeant Ice Field. In addition to that, it recognized two extremely scenic areas. One, the Harriman Fjord, College Fjord area. Harrimam Fjord hasn't been mentioned, but it's at least as spectacular as the College Fjord area. It's got seven or eight glaciers coming down into it and it's a tremendously scenic area. The other area that we identified was Columbia Glacier, which has been spoken to and it's as outstanding a saltwater glacier as there is in Alaska.

Mr. HARVEY. We'll go into the wildlife area now. Who wants to kick off on what's there and—yes?

Wildlife and Fish Resources and Uses

Mr. BEAL. I've got a bunch of overlays on a base map that would speak to everything from wildlife to land ownership to the uses that exist the commerical forest land and some of these, perhaps, at this time we could go through individually and look at, and I can submit them to you as part of the record and you'll have a set of them for your own use. But I do have one on wildlife that generally shows where the animals are. Perhaps it isn't necessary to look at that specifically now. I can speak individually to the areas, as we know them anyway.

Taking them from the north to the south, the Chickaloon area, the addition to the Moose Range, we do recognize that—as Bob Richey mentioned, the values and the waterfowl values particularly, down on the flats. Several years ago, we entered into a cooperative agreement with the Fish and Wildlife Service; the Alaska Department of Fish and Game and the Alaska Division of Lands to cooperatively manage the Chickaloon Flats area, and area of some 48,000 areas there at the mouth of the Chickaloon on the flats forest, for waterfowl values particularly. And in addition to those values in there, it's a prime moose range and it runs up into some—all the way from the flats at sea level up to spruce, aspen, birch, cottonwoods, up into the alpine country. Then moving down into the Prince William Sound area in our wilderness proposal, the Nellie Juan area, in that area, Hatch mentioned the sea mammals, which are certainly one of the wonders down there, and the high populations of sea otters and porpoise, whales, seals, sea lions, and they're readily in view of the people on this area and the large numbers of recreation users, recreation boaters that are in Prince William Sound. There are also mountain goats in many of the valleys, black bear in rather good populations and some of the branches of black bear. It's a popular hunting area. Waterfowl certainly is an important resource in the Prince William Sound area. Probably as important or more important is the value for—the fisheries value in Prince William Sound and the commercial fisheries value. I do have an overlay that shows the potential aquaculture sites and the existing aquaculture sites in the wilderness proposal and if that could be held up, perhaps you'd get some idea of the numbers of sites and the existing potential for agriculture there.

Mr. GRAHAM. All these several squares and triangles—

COURT REPORTER. Mr. Graham, I can't hear you.

Mr. GRAHAM. I'm sorry. I think I can just point out here that the circles, the triangles and the squares around here are all existing or potential sites. The—there are a number of existing fish passes, a potential fish pass site, existing aquaculture sites, a few, several potential. One that's probably worth mentioning right now is the current request by the State of Alaska to develop a fish hatchery here at what is called Cannery Creek. This would not be a conforming use to what we normally think of as a wilderness area, talking about permanent residences and impoundment of Two-Acre Lake, an air landing strip, a little bit of road.

Mr. HARVEY. Can you define an aquaculture site?

Mr. GRAHAM. OK. I think it's talking about a——

Mr. HARVEY. I mean, what are you—hatchery is one, apparently?

Mr. GRAHAM. I'd say that on the most—heaviest development end, we're talking about large fish hatcheries. On a very minor scale, perhaps the removal of logs that might be creating a barrier to the movement of the various fish, so we have—the term is pretty all inclusive of anything that is going to improve the situation for fish. I think that the reason that the administration has suggested Prince William Sound for a study area rather than an immediate designated wilderness is primarily the foreseeable conflicts with the more heavily developed fish hatchery-type aquaculture in there, and we think we need to look pretty closely at the need for the development of these things in this area, but it is pretty important from that standpoint. I shouldn't let it go and say that's the only consideration, because I'm sure that when we get to minerals and State and Native selections, we'll find there are also some problems in the Prince William Sound.

Mr. HARVEY. Is that it?

Mr. GRAHAM. Yes.

Mr. HARVEY. Are there any other comments on the wildlife? Go ahead.

Mr. RICHEY. Yes. Mr. Chairman, Bob Richey of Fish and Wildlife again. I think that we should point out that the northern extension to the Kenai Moose Range supports the largest caribou herds on the Kenai Peninsula. Forty-seven caribou were introduced during 1965 and 1966. Excuse me, 1966 and 1967, and that particular population has grown in the past 10 years up to about 400 animals and I think there are members here—of fish and game who have been regulating the hunts there and have been doing the—are primarily responsible for a population census, who might be able to clarify their numbers. But I suppose we're talking today around 300 animals up there.

There have been, as mentioned before, there are moose throughout that area, and some extremely large heads. Hunting has been allowed, primarily by horseback and—in the area, and it's also a good fur-bearing region, good trapping area. In the southern extension, we shift out of the—well, if I may go back for a moment, something does come to mind here on that northern extension to the Kenai Moose Range, and that is the fishery values there in Chickaloon. They may not be as great as compared to the Kenai River and some of the other rivers on the Kenai Peninsula, but there are a number of of salmon that do migrate through the Chickaloon River into upper water drainages and this is another important point on the protection of that particular drainage area into the Chickaloon River and Chickaloon Flats.

In a southern extension, we've got black bear country and some brown bear, but primarily it's an alpine habitat and it's the southern—pretty much the southern limit of the sheep range and turns into more goat habitat in that marine environment, and there are goats there. I notice on some maps, they indicate goat calving areas between Bradley Lake and Dinglestadt Glacier and Sheep Creek. There's also extensive hunting in that area for both the goats and sheep. Thank you.

Mr. HARVEY. Any other comments on the wildlife?

Mr. SOMERVILLE. Yes. We, too, had somebody here all day and I'm afraid he got tied up at the last second. It it's possible, Mr. McCurdy from Cordova, a commericial fisheries biologist, wants to speak specifically to the aquaculture enhancement projects in the Prince William Sound, if it's possible tomorrow, if we do take it up, we would like to also address that subject. We have a couple of additional things just to point out.

Again, Prince William Sound, because of its support for marine mammals, we have applied for a marine mammals—and that—one of which is seal. We would anticipate trying to promote again commercial harvest of seals in the Prince William Sound area, and there may be some chance of conflict. I'm not sure. Also there has been traditional harvest of marine mammals in the—what is the proposed College Fjords area. There is a potential conflict there. Other than that, there is limited use of goats along the College—the Kenai, Fjords, excuse me, beach line, but it's very small in terms of numbers harvested. It's very rugged country, hard to get to for any purpose. It's been mentioned that it's very rough water. The other additions to the forest, there is very little conflict on.

Mr. HARVEY. Anything else on the wildlife?

Mr. CLINE. Dave Cline, Alaska Coalition. In evaluation wildlife and habitat values of the northern—both northern and southern additions to the Kenai National Moose Range, I don't think it should go unnoticed that an exhaustive wilderness review was conducted on the existing Moose Range back in 1971 and 1972, and a wilderness proposal put forward to the Secretary of the Interior. I feel that, in being a part of that study process, a well-balanced wilderness proposal was developed, and at this time, conservationists are urging that the wilderness standard with the southern and northern additions, proposed additions to the Moose Range, be considered in the light of that—of the study results. As you probably realize, the Kenai Peninsula, specifically the Moose Range, is the most popular recreation area and Alaska's most highly populated region which, of course, is the Achorage Bowl.

The wilderness study that was conducted took in the consideration and need for manipulating winter range particularly of moose and those areas were excluded from the wilderness proposal. A key part of the wilderness in the Moose Range, itself, would be the canoe system, so-called Swanson River and Swan Lake canoe systems, which are heavily used by recreationists from the Anchorage area.

In terms of the southern addition, there's some high country there that's extremely critical summer range for moose and as Mr. Richey pointed out, in which the additions to the south would be high alpine country, which is in a defacto wilderness condition at the present time. So we feel that full evaluation should be given to wilderness qualities of the entire Moose Range area, as we evaluate the various management systems that might be most applicable.

Mr. HARVEY. Yes?

Mr. GORDON. On the Kenai Fjords coast, there are a number of large marine bird colonies. The islands are proposed for addition to the maritime refuge, but this is a complex that has been brought out, and the islands which have large colonies of a variety of birds, particularly the largest puffin colony I know of, the adjacent waters are heavily used by these birds and therefore are extremely valuable or extremely productive in terms of marine life, plankton and so forth. The area is also the site of a large sea lion colony and of all of the accessible areas of open coast in Alaska, the areas that people can get to easily, this probably puts on the best wildlife show. So in that sense, human use of the marine wildlife, it's probably the outstanding area in Alaska for an open coast.

The Prince William Sound area has an area on the southwest side between the islands and the fjord mainlands, in the Knight Island, Elrington Pass, Rainbridge Narrows area. In other words, the area where—the west sides of Montague Island, between Montague Island and the smaller islands and the mainland. This is an area in which sea otters are frequently visible, perhaps one of the easiest places in Alaska for people to see sea otters, and it's also one of the two best places I know of in Alaska for concentrations of whales. I've actually seen four different species of whales there. You can approach them quite closely. The feed there, they spend a good part of the season there. You can sometimes see the pups, although they don't pup in that area. Or calve, I should say. And the passages between the islands and the mainland, the Montague entrance, which is the main passageway there, are frequent areas where whales will hang out all summer. So from that point of view, it's a superlative, key critical habitat area for whales.

Mr. FOLLOWS. Mr. Chairman, Don Follows, National Park Service. I'd like to address some comments to the Kenai Fjords area. The major—the largest land mammals in that area are the mountain goat and the black bear. This is mainly because it's on that wetter side of the Kenai Mountain Range, on the east side over there. As Mr. Somerville pointed out, there's a pretty low harvest right now of goats and black bear in that area. They're mainly hunted from boats in the fjords and for example, in 1974–75, nine goats were killed in all subunits of game management No. 7 there and a total of eight black bear were killed that same year. Now, if we go up through the 1976 figures, there is increased use in that area and I think that sportsmen are probably spreading out more and trying to utilize that part of the resource.

Now, in 1976–77, we had some 24 goats killed, as opposed to only 9. So also as you come out into the fjords, as Rich mentioned, the Chiswell Islands, the Pye Islands and all the areas off the ends of the fjords are tremendously upwelling areas where you get all the nutrients being enriched and coming in from the sea, and in that area we have a lot of high fishery productivity. You also have the sea birds and marine mammals living there on those shores. So there are sea lion rookeries, also tremendous sea bird rookeries. In the summer of 1976, with the Fish and Wildlife Service, we conducted a 600-mile survey of the coast from Point Adams to Seward and we did first inventory on the ground all the female sea birds, harbor seal, sea lions, bald eagles, bald eagle nests, plus taking a very thorough look at the scenery, the waterfalls, the glaciers. Supposedly a general reconnaissance of the area, even some timber things were done on this trip. But anyway, out of that report, we were able to clarify some of the known values, wildlife values in the area and we found that we had estimated, on previous information, that we had 10,000 sea lions on the Pye and Chiswells. We found 5,800, so no big deal. We found sea bird colonies. We identified adult birds and the old data is 250–268,000 adult sea birds on those islands. Well, we found 101,000, but it's still significant, because these were beautiful sea birds to look at. Some very significant things were found.

They found the northernmost nesting sites of the rhinoceros auklet. They found the fork-tailed storm petrel. They found a lot of sea birds that visitors are interested in in the future, including Kitlasses muirrelet egg, which is now the only one in a collection in the country at the Smithsonian Institution. So a lot of exciting things that way for the type of visitors that come out and utilize and see those areas. Also off those shoals, we have bottom fish, red snapper, black bass, lingcod, greenlings, all living right in the proximity of those shoals. And this is a question I'd like to address to somebody in the Fisheries: What provision is there for protecting the habitat on which those sea lions and sea birds depend? In other words, there's an interrelationship there and this spring, they will start bottom fishing industry in Alaska possibly for the first time and maybe will be concentrating on some of those habitats for the first time. Thank you.

Mr. HARVEY. Yes?

Mr. PROPST. Carl Propst, Chugach Native.

COURT REPORTER. What's your last name?

Mr. PROPST. In regard to the Kenai Fjord proposal, I'd just like to mention that our stockholders down in the Villages of Port Graham and English Bay have been having quite a bit of difficulty lately in their subsistence lifestyles. For your information, English Bay is predominantly subsistence oriented. In Port Graham, quite a bit less so, but they still do rely on subsistence, and for that reason, as well as for other reasons, those two Village Corporations made large land selections in and along the Kenai Fjord area, and talking with the people there, they do foresee gradually migrating up that way in their subsistence harvesting on their land selections and certainly anywhere else that would be open for that purpose. So while there's not a great subsistence taking in the Kenai Fjords right now, I think it should be expected to grow in the future.

Mr. HARVEY. Thank you. Yes?

Mr. SOMERVILLE. Yes, I think one point to clarify there is that respective subsistence resources of any magnitude can only come from marine mammals and fisheries. I mean, there's just not much of a land based resource there to support any traditional subsistence. I think you'd probably agree with that, and the answer, possibly, to the—there is an interest in more offshore ground fish commercial fisheries, but nothing expected in that particular area. There are—has been some interest in continued shrimp or scallop fisheries all through the Kenai Fjords and if there was a conflict, you know, if there was a conflict in the designations, there are fishery people who will want to know about that. I should mention subsistence, there are a few other places in the Prince William Sound, who have relied—smaller villages, who relied on mammals, in particular, deer. There is deer throughout this part of the Prince William Sound, and particularly, though, the main subsistence resource is fishery.

Mr. HARVEY. Yes?

Mr. FOLLOWS. Don Follows, National Park Service. I'd just like to confirm what Mr. Somerville mentioned about the dependence on the sea. In the proposal, in a subsistence research report that was done on July 25, 1977 for the total subsistence take in that Kenai Fjords area, we had 1 mountain goat, 2 black bear, approximately 40 harbor seals and then the rest was 400 bottom fish of all species and 1,000 salmon, and this was the estimated yearly subsistence take.

Mr. HARVEY. Any more comments on the wildlife?

Mr. SOMERVILLE. One thing I think, traditionally, in the past and from the Natives who have harvested marine mammals in that Kenai Fjords area, one of the methods has been to take seals while they've been on the ice. It's a fairly common method, that any place you can't get them on the land base, you shoot them on the ice or land there where they graze and it's a fairly common method of getting seals. Dick has had some experience with that and he may have some comments, but this is one area that they have done that in and I just thought I'd mention that, since it's tied to the Fjords proposal.

Mr. HARVEY. Very well. Any further comments on the wildlife? All right. We'll adjourn for this evening and we'll resume at 9 o'clock with the aquaculture and marine issue.

ALASKA NATIONAL INTEREST LANDS WORKSHOPS

THURSDAY, FEBRUARY 16, 1978

KENAI—WILDLIFE VALUES

Anchorage, Alaska

Mr. **Harvey**. The workship will come to order. When we adjorned last night, we were on the subject of the various areas in the Kenai. We had concluded our discussion of the wildlife values in the area, with the exception of the State of Alaska who wanted to give some information about aquaculture.

Mr. **McGurdy**. Yes. Mr. Chairman, My name is Mike McGurdy. I represent the Alaska Department of Fish and Game and I'm based in Cordova and I'd like to give a short rundown on the activities of the department concerning commercial fisheries within Prince William Sound. First, annually, we forecast returns of pink and chum salmon in Prince William Sound, which encompasses on the eastern boundary, Cordova, over to the western shoreline and including the islands. The basis for the forecast are three indies.

In other words, we go to about approximately 40 streams every spring and then take an index of abundance on three emergent slides of those pink and chum salmon. To date, the forecast has been one of the most accurate on the west coast and possibly in the world concerning salmon, pink and chum. In order to continue this program, we have to have access to all streams throughout the Sound. We work from a boat and we go up these streams, indexing various intertidal and upstream areas and these streams are chosen by run timing and by either what we consider major or minor run contributions to the overall returns.

Second, each year we enumerate a statement on the gounds. We do what we call foot surveys, and these are conducted on approximately 100 of the salmon streams within the sound and the approximate—approximately account for—accurately account for 80 percent of the streams within the—escapements within the sound. It's an index, but a highly accurate one and consistent. Again, this covers streams throughout the sound. On rehabilitation, as of right now, we have cooperative—the Department has a cooperative agreement with the U.S. Forest Service, the YCC workers, to install egg streamside incubation boxes for the implementation of pink and chum salmon. These boxes are temporary in nature, as we project them now. Also habitat evaluations for improvement of salmon runs in the areas that have been stricken particularly roughly by the 1964 earthquake. These areas still haven't recovered their full preearthquake production levels. It might necessitate in some areas the implementation of fish passways and such, and even at times small sketchettes you might call them, to house eggs in boxes to the tune of maybe a couple or 3 million eggs.

These would be temporary, again, in nature and as far as the cooperative agreement goes.

For future work, I'm going to be wanting to have access again to just about all the streams within the sound, as I'm now building a computer library on all the past data, preemergent thrive salmon egg deposition indices, a statement of commercial catch. In conjunction with this, we'll be tagging salmon on an annual basis, as money allows, and again I stress access to all streams. This won't be necessarily with mechanized equipment, it's strictly foot. People walking around. I would like to submit these two documents, if I might, Alaska Department Technical Data Report No. 26 and Technical Data Report No. 35. These are recent documents that I don't believe you have right now. One deals with a historical catch statement, related commerical fisheries statistics for fish and shellfish principally inside Alaska and it has monetary values to the fishery, plus annual escapement. The second document is historical pink and chum, estimated spawning escapement and it's from 1960 to 1975. This particular document will give you the scope of how big our programs are out there and how intensive, for the better management of the resources.

Mr. HARVEY. Fine, thank you very much.

Mr. GRAHAM. Mr. Chairman, Hatch Graham with the Forest Service. Do you have any information on the proposed hatchery sites in the sound and what their contribution would be to the returns?

Mr. HALL. My name is Bill Hall. I represent the Prince William Sound Aquaculture Corp., also the United Fishermen of Alaska. We have prepared on brief notice a map designating the potential hatchery sites, the potential hatchery sites in the Prince William Sound that we believe are of high potential. As I stated the first day I was here, on Monday, in regard to southeastern Alaska, it's difficult to identify all of the potential hatchery sites in Alaska, whether it be Prince William Sound or Chugach or Tongass National Forests. Our concern is that we identify the specific sites of high potential and that we also attempt to get general language written into the legislation, providing for access to sites that we may not have the foresight to identify at this time. I can, if you would like, identify on your map over there the sites that we believe are of high potential.

Mr. HARVEY. That would be good. Let me ask you one question, so we can get this in the record. There's two parts. One, would I be correct in assuming that if you have identified *x* number of potential hatchery sites, you're not saying that you think there would be a hatchery on each site, or are you? In other words are we thinking about ten hatcheries with a hundred potential sites or are we thinking about a hundred sites for a hundred hatcheries?

Mr. HALL. We're talking hatchery sites, we're talking about sites that have adequate water supplies, lake systems that provide adequate fresh water to it year round, that will provide water for the fish. In terms of Prince William Sound, looking specifically at the areas that have been designated as potential wilderness areas, we're looking at approximately 10 sites that have high potential and those would be sites that would require some form of substantial development. In other words, you would have to have structures on them. And so, If I answer your question correctly, we're looking at probably maybe 10 sites on Prince William Sound.

Mr. HARVEY. Now could you elborate a little bit when you say the development, what would be involved?

Mr. HALL. At the present time, with present technology, looking at artificial incubation of salmon during their early periods of life history, we're looking at structures that are comprised of a building, that's heated, that can protect the fish from the weather, and we're looking at water transmission lines, water intake structures. We're looking at people who are going to have to be there to man this facility. We are, therefore, looking at sewage treatment plants, electrical generation facilities, we are looking at, in one sense, a very small community. We're not looking at a lot of people, we're looking at—on a 50 million slide capacity hatchery, we're looking at maybe four people. But you have to have all the support facilities necessary to sustain those people.

Mr. HARVEY. With an airstrip, too?

Mr. HALL. Not necessarily. Most of the hatcheries we're looking at or the sites we're looking at are accessible by water. Obviously, the fish have to get into the marine environment, so we're looking at—we're not really looking at airstrips all that much, no.

Mr. BEVINETTO. Permanent year round habitation, of course?

Mr. HALL. Yes. And dock structures.

Mr. WILLIAMS You said that there were 10 sites that you were looking at; is that what you said?

Mr. HALL. Yes. Again, when you're talking about salmon rehabilitation and enhancement, and we prefer to use that word rather than just generally aquaculture, because aquaculture means many things to many people and we're talking predominantly about salmon right now. When you're talking about salmon aqua—rehabilitation and enhancement, you're not only looking at hatchery facilities, you're looking at the desire maybe of putting in fish slides of some type. So again, the approach that our organization has taken and that the Aquaculture Corp. in Southeastern has taken, is that we would like to identify those sites that have high potential for hatcheries, as I just described, which will require some form of development. No way can we really see all the potential, so that we also feel that we very dearly need some form of language in the legislation that at least authorizes the appropriate authorities to say, yes, you know, we will—you know, we do have the authority to allow you access to this at a future point, if it's considered desirable and if it meets certain criterion and abides by certain safeguards.

Mr. HARVEY. Are those sites indicated on the map?

Mr. HALL. Yes, they are. I can give you this.

Mr. HARVEY. All right. Yes, why don't you do that? Let me ask you one other thing. If you have any thoughts about the specific language, we'd be glad to receive that at some point.

Mr. HALL. What I'm doing right now is, I've met with representatives of people who have experience with the Alaska coalition and I've also met with some of the Fish and Game people and the United Fishermen of Alaska will be having a—their annual meeting about a week from now in Juneau and we're trying to work out language that will be acceptable to most parties that are involved in the Alaska scene, so that we can have a united plan. So the actual wording in the language isn't—hasn't really been agreed upon, although we have arrived at some agreement on a lot of the concepts. So I would prefer to wait until we get it more carefully thought out.

Mr. HARVEY. That's fine. But I would like to have that.

Mr. HALL. Thank you.

Mr. GRAHAM. Mr. Chairman, Hatch Graham again. Could I follow up on my question?

Mr. HARVEY. Yes.

Mr. GRAHAM. I hear about these hatcheries and the amount of fry they produce. What is the estimated return in terms of salmon and what does this mean to the people of Southcentral?

Mr. HALL. That depends on what species you're talking about. We're dealing predominantly with pink and chum salmon. Experience with the Japanese, with the Canadians and with the—also in Alaska indicate that ocean survival of pink and chum salmon from hatchery systems is in the area of 1½ to 2 percent of the fry that you release, so if you're talking about releasing 50 million fry and you're going to get a 2-percent return, you're talking about, let's see, 200—2 million? You're talking about 2 million fish coming back. As experience—in fact, experience has shown that these figures, with improved technology can be increased. The economics of it is the cost of building the hatcheries versus the return. In Alaska, with the production costs that we're looking at, it is under study. We don't have that much experience behind us to indicate just what type of a cost/benefit ratio we're looking at, but we do—we are working with the economists of the University of Alaska to determine what the outlook is going to be.

Mr. HARVEY. Anything else on this subject? All right. Let's move on to look at the renewable resource values, timber, agriculture, et cetera. Anyone want to take off? This young lady, would you identify yourself?

Ms. JOHANNSEN. Yes, backing up a little bit—my name is Elizabeth Johannsen and I was asked to come and testify on the scenic potential of the Nellie Juan and College Fjord area. I was not here yesterday.

Mr. HARVEY. Oh, all right. Go ahead.

Ms. JOHANNSEN. I don't know what has been said, but I'm a recreational boater. My husband and I have collected data on the area. The area is little known at present for its scenic potential, because it is not an accessible area. There's only two ways to really get out to the Nellie Juan area and that is by floatplane or boat and to get out there by boat, most people have to go via Whittier and the only way to Whittier is through a one-way train tunnel which has an erratic train schedule. If this railroad tunnel is opened, made into a road, this area will receive a lot of recreational use, and we have to address that. The Nellie Juan area has been under proposal as a wilderness study area for some years by the Forest Service, because of its high scenic potential. It's an area of numerous protected anchorages, even more numerous islands. It's a kayaker's paradise, the same for sailors. It has large fjords, with Yosemite-like sides, big waterfalls, It's rapidly becoming a very popular area, in spite of its inaccessibility.

The other area is College Fjord and Harriman Fjord. I believe it has been under proposal by the Forest Service also as a scenic area in the long-range master plan, and also the addition to the College Fjord area was first recorded by the Harriman expedition in 1899. Up till that time, Harriman Fjord was not on any maps of Alaska. If any of you have seen the Glacier Bay area or seen photographs of it, it's very similar to that country. Very, very spectacular, numerous, numerous glaciers. I've brought photographs of the College Fjord area, realizing that a photograph is worth a thousand words, and with that, I can be here to answer any questions on that area. I've spent a lot of time in both areas.

Mr. HARVEY. Thank you very much.

Mr. HESSION. Mr. Chairman?

Mr. HARVEY. Yes?

Mr. HESSION. Could I back up for a moment to the Kenai Moose Range and mention one thing briefly? I just wanted to note that the Swanson River canoe system is one of the most important lake/stream recreational systems in the State of Alaska. It's proposed for wilderness as part of the whole Kenai Moose Range Wilderness and because it's so accessible, it's heavily used. In general, rivers with a primitive character close to population centers take on increased importance in terms of the State's population and, therefore, this system is exceptionally important in our estimation. Thank you.

Mr. HARVEY. Thank you.

Mr. WICKES. Mr. Chairman?

Mr. HARVEY. Yes?

Mr. WICKES. If you'd permit me, I have just a couple of statistics to toss out on the wildlife habitat values. Basically, for the outlined habitat values on a statewide basis, the values are moderate, most ranging for the three proposal areas we're considering is the Chugach addition, the Kenai Moose Range addition, and Kenai Fjords. These areas rate in the top half of the outlined habitat areas in the State.

Mr. HARVEY. Let's go on to renewable resources.

Renewable Resources

Mr. BEAL. Clay Beal with the Forest Service. yesterday, we had some overlays of the resources on these areas. Maybe I could start off with the Chickaloon, the addition to the Moose Range up there. As far as timber goes, commercial forest land is 3,360 acres, containing about 16 million board feet of timber. Also in that area, the commercial forest land overlay of the lower area. While we're talking about renewable resources, we probably should mention the recreation resource and that sort of gets missed sometimes. Someone mentioned last night that the Moose Range received a lot of recreational use in the Anchorage area. The Chugach National Forest receives quite a little bit more recreational use on the Kenai than the Moose Range does, and although that's a rather inaccessible area, it is a tributary of the Indian Creek portion of the Chickaloon and is a tributary area for the recreational uses on the Resurrection area.

Then moving down to the additions to the Chugach, the Nellie Juan addition, the figures we have there include some of that front country that may or may not be in the addition proposal. It goes on down toward the water, and there we show 7,800 acres of commercial forest land, with 179 million board feet of timber. All of the timber in the Prince William Sound area, which includes the additions to it, is scattered. No concentrated large areas of commercial forest land anywhere in the Prince William Sound/Nellie Juan Wilderness, and that includes that 1500 wilderness as well. There are no large concentrations of commercial forest. For the College Fjord addition, we show 5,900 acres of commercial forest land, with some 135 million board feet of timber. In the S. 1500 proposal, which includes the area now within the national forest, there's 99,600 acres of commerical forest land and 1,335 million board feet of volume there. Speaking again to the recreational uses, as Betty Johannsen mentioned, the recreation boater use and that is a considerable use in the Prince William Sound area and an increasing use. The people come not only from Whittier, where most of the people from Anchorage find their recreation in boating water, but from Resurrection Bay and on out, from there and the Prince William Sound. I would suspect right now that 90 percent of that recreational boating use is within, oh, 50 miles of Whittier. Not—people right now are limited with fuel, as to how far they can go from there, because there aren't many refueling stations in the Sound.

Ms. JOHANNSEN. Whittier is the only refueling station.

Mr. BEAL. Right now, yes. The people in Whittier, as we get down to State selections, have made some selections on the national forest and intend to increase the harbor capacity down there, which will increase the recreational use out in the Sound.

I have another overlay that lies behind you, showing the manmade features of the Sound, which include cabins and aquaculture, fish pass improvements, lighthouses, that sort of thing, and those all will be submitted to the record.

Mr. SILVER. Mr. Chairman?

Mr. HARVEY. Yes.

Mr. SILVER. What kind of interest has been shown by the timber industry in this area?

Mr. BEAL. Right now, there's really no timber industry that relies predominantly on the timber in Prince William Sound. There's been timber harvesting taking place in the Sound for the past, oh, 30 years anyway, maybe 40 years. There is a history of small timber sales, with a probable average annual harvest of between 2 and 3 million feet.

Mr. SILVER. So it's a fairly low priority area?

Mr. BEAL. It's of fairly low priority in this area.

Mr. SILVER. Thank you.

Mr. HARVEY. Any other comments on the timber, et cetera?

Mr. HALL. I would say that the Chugach Native Corporation and the Eyak Native Corporation have selections in Prince William Sound that do contain timber resources and I know they do intend to develop it, and that would have some impact upon associated areas.

Mr. HARVEY. Thank you. Anything else? Mr. Wickes?

Mr. WICKES. Jim Wickes, Department of Natural Resources. Our computer information on a statewide basis indicates that the forestry potential within the Chugach—the Morton Proposal Chugach addition comes to some 91,000 acres and the middle level ranges from the fourth to sixth 10 percentile, so it's somewhat moderate in potential. For the Kenai Moose Range, the potential comes to 138,000 acres. Again, it's sort of a middle range level of three to four to five, and for the fjords, we have the same picture that—on a statewide basis, the timber ranks about in the middle on a statewide basis.

Mr. HARVEY. Anything else on this area? All right, let's pick up the State and Native selections and other private lands situation.

State and Native Land Selections

Mr. WICKES. OK. Thank you. For the Kenai Moose Range addition, our data indicates present native selections total some 152,000 acres, but of that, we estimate that some 12,000 acres will remain, so there is considerable overselection at present within the Moose Range addition. For the Kenai Fjords, we have a similar overselection situation on Native lands. 191,000 acres being under selection now, we estimate somewhere around 54,000 acres, a 75 percent reduction will occur. Within the Kenai Fjords area, State lands comprise some 42,000 acres and I do not believe there is any State land or any selection interest areas in any of these other areas, with the possible exception of some natural forest selections that Mr. Beal indicated.

Mr. HARVEY. Anything else?

Mr. BEAL. Clay Beal with the Forest Service. The base map directly behind you shows the native selections and State selections. One thing that wasn't mentioned when we were talking scenic, and I can see the archeological values should have been discussed there, but I thought that someone from the Chugach Natives might be here, but also shown on there are the cultural and historic selections that the Chugach Natives have identifies in Prince William Sound.

Mr. HARVEY. Any other comments on this?

Mr. PROPST. Carl Propst, Chugach Natives. In the two areas, there are five village corporations which, among them, have an entitlement of roughly 550,000 acres and right now, before conveyance, of course, they've selected considerably more than that. That's all known information, though, it's on your maps. Possibly one or two major things that are not on there that—which might come to be in the future that you should know are, first of all, that the Regional Corporation was prohibited from making land selections in the Chugach National Forest under the 14-H(h)(8) entitlement, the miscellaneous entitlement. This is something that may be corrected legislatively in the future that you should have for your information, and the second large unknown is that the Regional Corporation also is just entering discussions with the Interior Department now concerning an exchange of land selection rights that would involve the Chugach Forest. That's, I'd say, a large unknown, because it could be on the order of several hundred thousand acres there. The rights that would be exchanged are the existing land selections in the Bremner River valley for forest lands.

Mr. HARVEY. Thank you. do you want to go ahead?

Energy Resources

Mr. Sisson. Alex Sisson with the Alaska Oil and Gas Association. In front of me here is the USGS published map or the upper Cook Inlet. It's a geological map of the upper Cook Inlet. In this area in here is the Kenai Moose Range. Within the Kenai Moose Range, there is one producing field called the Swanson River Field. The Swanson River Field, on published data, has a total recoverable oil reserve of 223 million barrels, of which approximately 163 million have already been produced. Those are the published figures for this particular field. This in red here is the Kenai gas field outside the range and which is—has a recoverable of 2.2 trillion cubic feet of gas. The area in the Moose Range, there are still—from our data, there are still areas in which we do have possible or probable oil production. In other words, there are areas that have been defined with surface anomalies of anticlines which are possible producers. We certainly don't know. In other words, what again we would like to stress is that this is an area that does have potential in the future for future exploration.

Mr. Harvey. Any comments on the rest of the area?

Mr. Sisson. Well, I will talk a little later about the Chugach addition in the Copper River area down near Cape Suckling, but that is another addition we will talk about later on. However, this area in here has little or no interest as far as oil and gas potential is concerned. That is, you're talking about the Nellie Juan area and so forth?

Mr. Harvey. Yes.

Mr. Sisson. Um-hmm. It has sedimentary rocks, which the geologists again would like to look at, but they're not potential rocks as far as oil and gas are concerned.

Mr. Silver. What about staging for the OCS project?

Mr. Sisson. That certainly is very possible, when and if we ever have a western—what they call the Western Gulf of Alaska or the middle—the Northern Gulf of Alaska OCS sale in this area. Yes. There's Montague Island. In this area down in here, in the Middleton Island area, that is a very good possibility.

Mr. Follows. Mr. Chairman?

Mr. Harvey. Yes.

Mr. Follows. Don Follows, National Park Service. On the Moose Range area, you mentioned the anticlines as possible producers. Is the presence of the hydrocarbon known in that anticline at this time?

Mr. Sisson. By no means. This is such a risky business and there's no wells been drilled on those anticlines. They have been defined and as shown on some of these maps in here, on this map, for instance, here, there are a number of wells been drilled on them. They're dry, but that does not mean the anticlines are not productive in some other area. This is such a risky business that you wouldn't know until you started drilling a great number of wells.

Mr. Harvey. Any other comments on the energy potential?

Ms. Johannsen. Just a quick answer. On the staging areas that you asked about, there's numerous opportunities for staging areas outside the proposed Nellie Juan Wilderness area. There should be no problem.

Mr. HARVEY. OK. Yes?

Mr. REFFALT. Bill Reffalt, Fish and Wildlife Service. I'd like to know how many wells have been drilled in that north part of the Kenai Moose Range, or do you know, sir?

Mr. HARVEY. I think we can get that information. Are there any more questions? Yes?

Mr. WICKES. Jim Wickes, Department of Natural Resources. Our statewide information and assessment on oil and gas, coal and uranium does not even rate these areas as being—having any significant potential whatsoever. But the——

Mr. HARVEY. Does it rate the Swanson River field as not having any potential?

Mr. WICKES. Well, no, I'm not saying that. I'm talking about the proposed additions.

Mr. HARVEY. Right. Yes, I understand. I thought maybe we could discover a flaw in the system. Any other comments on energy potential? We're going to get that number and we'll plug it in at the right time.

Mr. BEVINETTO. Don't you have it in your office?

UNIDENTIFIED VOICE. Yes, but you don't have it in your records.

Mr. BEVINETTO. Why don't you give it to me, then?

Mr. REFFALT. Yes. It seems terribly low according to my information, but I'll have Bob Richey speak to that, since he's our assistant manager at the Kenai Moose Range.

Mr. SISSON. I'm talking only about the wildcat wells.

Mr. REFFALT. Wildcats.

Mr. HARVEY. He's distinguishing between wildcats and the developmental wells. I mean, there's lots of holes in the field.

Mr. REFFALT. Bob, would you—how many wells have been drilled in that area?

Mr. RICHEY. I think, just by looking at it, I'd say that's probably very close.

Mr. SISSON. On this map, there are 12.

Mr. RICHEY. That's certainly reasonable, from my viewpoint.

Mr. SISSON. But that does not include some of the extension wells off the Kenai—I mean, off the Swanson river field to the west. There's a few right in here that were dry. They were extension wells that were down just from the producing horizon.

Mr. RICHEY. I'd say there's a great deal of information on that, though, because we have better than 90 wells in that particular area, so certainly you appreciate the extrapolations from that information.

Mr. HARVEY. Any more comments on energy potential? All right. Let's get into the hard rock mineral values.

Nonfuel Mineral Resources

Mr. MENZIE. Dave Menzie, USGS. First of all, on level III information from the AMRAP program, it wasn't mentioned yesterday, but work is underway in the Talkeetna Quad and work is presently underway in the Seward and Blying Sound Quads. Comments on the Kenai Fjords addition, all of these—all of this area is within our Area 16, which is favorable for widely scattered gold bearing veins with some silver. These are generally small tonnage, but mostly are high grade, and it has some potential for placer gold. The Kenai Moose Refuge addition, this is also—part of it also included in Area 16. In the College Fjords addition, this is also most of—part of our Area 16 includes most of this region. The southern part of the College Fjords addition includes part of our Area 8, which is favorable for some small veins and placer gold deposits, and also for massive volcanogenic deposits.

And in Region 8, we estimate that there is a 90-percent chance that there is one or more deposits, a 50-percent chance that there are two or more deposits, and a 10-percent chance that there are four or more deposits, and that's for all of Area 8. Not all of which would be in that area. For the Nellie Juan addition, the northwest corner is included in our Area 16, which I referred to earlier. For the Nellie Juan wilderness, the eastern half is within our Area 10, which is also favorable for massive volcanogenic deposits and in Area 10, we estimate that there is a 90-percent chance of there being two or more deposits, a 50-percent chance of there being four or more deposits, and a 10-percent chance of there being eight or more deposits. There's also some potential for several small tonnage gold veins. Those are known. And there's one small breccia pipe cemented with zinc and copper sulfides that is known.

Mr. HARVEY. Anything else on the hard rock minerals?

Mr. WICKES. Mr. Chairman, Jim Wickes, Department of Natural Resources. Just a point of clarification, those figures I'm reading to you regarding the resource values pertain just to the boundaries as are on the map in back of you, the map for the general region. In terms of hard minerals, the Kenai Moose Range, according to statewide statistics, only 62,000 acres are considered to have any potential. Half of that figure, 31,000 acres, do fall in the second 10 percentile, statewide, and the balance are somewhat of lesser importance, statewide. The Kenai Fjords area, some 400,000 acres are expected to have some potential. Again, 71,000 acres in the top fifth of the State. The balance being middle range, from 4th to 7th percentiles. Chugach Forest addition, we have a similar situation where the grand total comes to be 435,000 acres out of the area total of 62,000 acres or roughly two-thirds of the area has some potential. Eighty thousand acres being in the top fifth. Thank you.

Mr. QUARLES. Any other discussion? Yes?

Mr. PITTMAN. Tom Pittman, Bureau of Mines. On the Kenai Fjords addition, there was very small gold production from vein type deposits in the Nuka Bay area. There are two small areas of prospects east of the Nuka Bay area. The Nuka Bay area is at the south end of the peninsula, with some scattered gold deposits to the east. In the Nellie Juan area, a very little placer activity has been recorded on the Nellie Juan River, but no production of any known consequence. The principal areas of interest are a predominantly copper belt on the east side of the Resurrection Bay, and extending up the peninsula and a gold belt with small lode properties, some early day production and a number of gold placer mines that are active now and had considerable historic production. This belt extends through here, the black dots are claims. This is the gold area, the copper is there. In the northern part of the area, there is a gold belt that has been active but I don't know of any current production. There also has been some placer mining. A number of small lodes have been worked in the past, and several had small mills. In the Valdez area are both copper and gold prospects. The principal interest in the Nellie Juan/College Fjords proposal area is the possibility of volcanogenic, so-called stratabound, massive sulfide deposits.

Just outside the Nellie Juan area there have been very significant producers on the northern part of LaTouche Island. The southern part of this island has been very actively prospected, detailed geologic work by private companies in the last 6 years. The Knight Island is a continuation of this highly favorable zone. The proposed reserve boundary crosses here, leaves the southern half out. The proposed boundary goes through Iron Mountain. Iron Mountain is just barely north of the property line of the Rua Bay deposit, which is an occurrence of massive copper-iron sulfides, that has been extensively drilled. There has been some underground work. It is the prime possibility for economic mining on Knight Island, as known so far. Iron Mountain makes an easily recognizable topographic boundary point, but the zone with visible copper mineralization extends to the north of the Rua Cove deposit up that backbone, along the backbone ridge and a well known occurrence lies within the proposed boundaries.

Mr. Harvey. Thank you very much. Yes, ma'am.

Ms. Johannsen. Yes. I just want a postscript to the Knight Island area that was just discussed. Although historically this has been an area of extensive copper mining, in relation to the rest of the Prince William sound, it also is an area of high scenic value. You have coves there where the cliffs go straight up three thousand feet from the salt water. It's possibly the most beautiful island in the Prince William Sound.

Mr. Jones. This is David Jones of the National Park Service. In 1976, the Park Service awarded a contract to consulting geologist, George A. Moreline, of Anchorage to make an investigation of the known minerals in this proposal and his report is based upon the Morton bid and on the definition of market value that I described yesterday, and his total estimated market value of known minerals was $70,500, and I'll ask George to come up and tell you how he went about his studies.

Mr. Harvey. All right. Thank you.

Mr. Moreline. I'm George Moreline and as Mr. Jones just said, I was contracted by the Park Service in 1976 to make a mineral appraisal of the valid existing claims in the proposed Harding Ice Field/Kenai Fjords National Monument. There were 10 claim groups, ranging from one to five claims, all of which were outside of the boundary of the proposed monument, but within an area of contiguous ecologic concern. The properties were on small gold veins, the average ranging from 1 to 2 feet wide, a few hundred feet long. The values within the veins ranged up to 10 ounces per ton of gold, approximately 7,000 tons have been mined from the area in the past, with an overall average grade of approximately an ounce of gold per ton. Most of the showings, there again, I looked only at valid claim showings that could possibly support one- or two-man operations.

Mr. HARVEY. How did you identify that the claims were valid?

Mr. MORELINE. By looking in the recording office and finding out when they had been staked and if the assessment work had been filed.

Mr. JONES. Just one question here, the use of valid mining claims might confuse some people. We don't know that the claims are valid until we go in and investigate the discoveries, but we have—throughout this Legislation—identified claims, unpatented mining claims, as legally located and maintained. That's every place up to the discovery.

MR. HARVEY. OK. That does help. Yes?

Mr. PROPST. Yes. Carl Propst of the Chugach Natives again. I'd like to add a little bit to Mr. Pittman's discussion of a minute ago. Speaking on behalf of the private sector in Prince William Sound, we're also quite alarmed about the boundary line that's been drawn right across Knight Island, because the volcanogenic belt obviously extends up through Knight Island. Second, Naked Island and beyond that, Glacier Island up here off of Columbia Glacier, are largely unexplored for minerals and a number of people in the mining field believe that the same belt extends up through Naked and Glacier Islands, both of which I believe are included in the H.R. 39 instant wilderness proposal. We're also concerned about that because of the land exchange, which I mentioned before, which would focus on some of these islands. I guess that's all that needs to be brought out now.

Mr. HARVEY. Thank you. Any other comments on the hard rock? Yes.

Mr. FANKHAUSER. Mr. Chairman, Bob Fankhauser of the Alaska Miner's Association. I would like to reinforce what others have said here about the mineral potential in this area. It's one of the most highly mineralized areas in Alaska. As you can see from Mr. Pittman's map there, there are numerous dots of known occurrences and locations of minerals. This area has been and is still being, you know, prospected extensively. I don't know what the total value of expenditures have been in the Prince William Sound, but it's in the millions, and I would caution the committee to keep in mind that though the present production there is minmal, as has been pointed out, this is a highly important area for future production. As the price of gold goes up, these areas are fairly accessible, they're one of the most successful areas in Alaska for gold production. The massive sulfide potential and the massive volcanics should not be underrated. This is a highly mineralized area.

Mr. HARVEY. Are you talking principally now of the area in the Nellie Juan area? I mean, you're not over in the Harding Ice Field, or are you?

Mr. FANKHAUSER. Well, right there where the fellow has pointed out.

Mr. HARVEY. All right. Fine.

Mr. **Fankhauser**. In that general area right there, and I feel because of the accessiblity, because of the probable rise in gold and because of the known volcanogenic massive sulfides that have been explored to some extent, that this area is—should be considered by the committee as an area that could produce future minerals easily. As someone else pointed out here the other day, the problem in mineral exploration is that the caribou migration, they don't respect these lines that we draw on maps and while there's no current production from this area, the intensity of the mineralized mineralization that is known, if you look at past recorded history of new mines, they are always—well, not always, but the chances are that they're going to be produced or developed in areas that have a long known history of mineral locations, and I suggest this would be one of the areas. Thank you for your time.

Mr. **Harvey**. Thank you. Yes?

Ms. **Johannsen**. Elizabeth Johannsen. I just want to put a historical perspective on these mining areas. Most of the little dots that you see on that map are from mining activity that took place prior to World War I, with a few areas continuing into the thirties, Granite Mine and I believe the Foster Gold Mine was active until the fifties. Most of those are pre-World War I and they're kind of an offshoot of early day Valdez gold miners who kind of branched out from there prior to the first World War. This was considered one of the more populated areas of Alaska. In the last 2 decades, I don't believe most of those mines have been considered economically feasible, although they are highly mineralized and they could be that way in the future.

Mr. **Harvey**. Yes. Thank you.

Mr. **Propst**. Just a final sentence or two. In our very recent contacts with the mining industry, we found a whole lot of interest, you know, in the form of capital that's willing to be invested and long-term exploration in the Nellie Juan proposal, so while it's very true that there's no current production there and that most of this does date back to the World War I era, there's a lot of current interest.

Mr. **Harvey**. Thank you. Yes, Tom?

Mr. **Williams**. Let me ask the State a question, if I might. I've been trying to follow along with your printouts here and I hope I haven't gotten lost, but I'm assuming I'm on the right track. I notice for the Fjords, the August, 1976 figures for minerals show about 133,000 acres in the second 10 percentile. Then we have the August, 1977 assessment, it looks like, cuts to about half. I assume that the half drops down into the 4th percentile there, since that's sort of large. I'm not terribly concerned about those figures in this particular area, but I want to ask just a general question about what you've found between the 1976 and 1977 runs. As I was following along the last few days, it would seem that usually the projections went the opposite way. In other words, you increased mineralization on the second time around. Obviously, that doesn't work out here. What's the general trend? Is it a wash, some go up, some down, to or what?

Mr. **Wickes**. Yes. Jim Wickes, Department of Natural Resources. The basic difference between the two assessments, 1976 and 1977, is the data base that was used. The methodology is pretty much the same. For the 1977 assessment, one of the base maps used was more recent information put together by Chuck Hawley under contract with the Bureau of Mines. These data sources were discussed in August. The Land Use Planning Commission convend a resource workshop similar to this, with resource professionals from the various geological agencies familiar with Alaska, and on the basis of that meeting, it was determined that the more recent information produced by Chuck Hawley for the Bureau of Mines should be used. So that's the basic difference. And you're right, in some areas, the potential dropped. In other areas, the potential, via the 1977 assessment, rose.

Mr. HARVEY. I gather that could be two reasons that the percentile could change. One was, you literally decided that the area—the specific area was less valuable than you thought it was, but more likely, isn't it, that you found another area, let's say, up near Mount McKinley, that you now decided was a higher rating, so you got the same mineralization information in the Harding Ice Field, let's say, but its ranking in the State drops because you find something else?

Mr. WICKES. Right. Basically, it's a relative scale, so as other areas are found more valuable, then the other areas are displaced accordingly. And I might add, for the record, Ross Schaff yesterday, State geologist, indicated that the geologists of the State are presently redoing this again. The data base is somewhat even more comprehensive than the 1977 one and the methodology is a lot more rigorous this time, too, so we should get a much more refined product in a couple of months.

Mr. HARVEY. All right. Let's move on to the transportation and access situation and concerns in this area. Does anyone want to comment on transportation needs, access needs?

Transportation and Access

Mr. GRAHAM. Mr. Chairman, for the record, Hatch Graham of the Forest Service. There is a gas line that traverses the Chickaloon Flats and there are, of course, others in place in the area. As far as the Prince William Sound area, I think that's already been discussed with regard to recreation and its boat access from Whittier, primarily.

Mr. HARVEY. Any other comments? Yes, sir?

Mr. HALL. Bill Hall, Prince William Sound Aquaculture Corporation. To get the point of information, the Alaska Department of Transportation has recently completed a study of transportation needs and desires in the Prince William Sound area, specifically, and that study should contain information that might be of benefit to the committee.

Mr. HARVEY. Is there any representative from the Department here? All right. Yes; go ahead.

Mr. WICKES. Mr. Chairman, Jim Wickes from the Department of Natural Resources. In regard to that study, the study came out of a court settlement relating to the proposed Cordova Highway some years ago, and the study is not quite completed, our understanding is. But it has involved a number of State agencies. The Department of Natural Resources has been very much involved in providing resource information to the Department of Transportation and I think the study will indicate apparent needs and desires regarding transportation in the Prince William Sound, and we will certainly make that available to the committee.

Mr. HARVEY. Would you make sure that we do get it?

Mr. WICKES. Yes; I will.

Mr. HARVEY. Any other comments?

Ms. JOHANNSEN. In the Kenai Fjords area, it's sort of a projected feeling, I don't think that will ever receive high levels of recreational boating pressures, because it is a very closed area. The storms in the Gulf of Alaska, it's a very dangerous area for boating, compared to other areas in the State. It should not come under a lot of heavy boating pressure.

Mr. HARVEY. Any other comments? Yes?

Mr. FOLLOWS. Don Follows, National Park Service. I'd like to point out that in the last 2 or 3 years in the Kenai Fjords area, there has been a tremendous interest in wilderness sailing and it is an area which can be rough, but it's also an area that we have found in our experience to be even a more mild place than Seward some days, because it is out on the coast. Last summer, approximately 60 students from the University went out on a 6-day sailing venture. They were out in various groups all summer long. On any given clear weekend out there, I've counted as many as 50 to a 100 sport fishermen around the Chiswell Island area, and this is a dramatic increase in the last few years.

Ms. JOHANNSEN. But it should be pointed out that there is not much—not many areas to run for shelter as you find, say, in the Nellie Juan area. I've been out there, myself, a lot to the Chiswell Islands.

Mr. FOLLOWS. That's true.

Ms. JOHANNSEN. It's an area that should be treated with great caution.

Mr. IMESONE. Excuse me. What is wilderness sailing?

Mr. FOLLOWS. This a term which I've heard used and I'm not exactly sure what it is, except there is a growing interest in taking a sailboat and going out on a relatively uninhabited, undisturbed coastline, which they have in that area and I'm simply repeating a term which was used by the people that put on these boat trips.

Mr. HARVEY. Thank you. Go ahead.

Mr. LEEDY. Bob Leedy, Fish and Wildlife Service. Just two very short points. One, on the boating, I think you might have been misled in the Kenai Fjords area somewhat last year, because the weather was uncommonly mild in comparison to many years ago. And second, we've mentioned only boating in the Sound. There are—there's quite a bit of aircraft traffic in the Sound as well, both by float planes and beach landings.

WRANGELL MOUNTAINS

Mr. HARVEY. I'm going to ask Dick Stenmark to run through some background on this entire Wrangell area which has been set out on the map here, which includes both the Wrangells and the Copper River Delta area. To show you how responsive we are to public demand, we will have—I think that it may be—I'm willing to concede that it's probably useful to split our discussion after

Dick sets out the parameters of the area, into the general Wrangells area and the Copper River Delta as a separate issue, although there are some proposals, obviously, that include the entire area and one thing, whatever it is. But in any event, we will break it down that way when we get into actual discussions, and Dick will take up the background. On which one you'd like to take up first, my inclination is to do the Wrangell Mountain area and then go to the Delta later. Dick, go ahead.

Mr. STENMARK. Thank you. Richard Stenmark, Land Use Planning Commission. In case any of you don't recognize the Wrangell Mountains and Chugach Mountains without current land status and several legislative proposals on it, this is the underlying resource. What we'd like to address, then, is everything from the Yukon Territory border, westward over to just short of the pipeline or the Richardson Highway down in this area, although on the north side of the Chugach Mountains, one of the proposals does extend over into—along the north side here, over as far as the Tazlina Glacier drainage area in here.

Basically, in this area, it will be the area east of the Copper River, up to the Tetlin Reservation area, on up through the Alaska Highway, around the Northway area. Southward, it will extend down into just about the Cordova area and to the Gulf Coast, over and including the Malaspina Glacier and Disenchantment Bay area. So that's basically the area we're covering. This has been variously proposed as—parts of it, as park, as national preserve, portions of it as national forest, some as wildlife refuge. One of the refuge proposals or a couple of them have included taking part of the existing Chugach Forest around the Copper River Delta and with additional lands, proposing that as a wildlife refuge. One of the other refuge proposals that's strongly been up in the area just south of the Alaska Highway and here. I think maybe that's enough to kick it off.

Mr. HARVEY. All right. Let's start with the general Wrangell area and leave the Delta till later. Who would like to kick off on the scenic values?

Scenic, Landscape, Historic, and Archeological Values

Mr. SHANE. Thank you. My name is Ben Shane, with the Alaska Coalition. I've been involved with the Wrangell Mountains region for about 7 years, including a number of years of study through the University of California. I'm an Alaskan resident and have lived year round in the Wrangell Mountains Park proposal at the nearest point to the Andrus proposal, and to start with, I'd like to submit for the record, please, a copy of a report that I worked on. This is one copy for the record and one personal copy for each of the staff. The first thing I'd like to address is an aspect of the scenic values of the Wrangell recreational values that's not often understood. We're talking about a very large area of Alaska, yet most of it is, in fact, covered with rock, bare rock and snow and ice, and we have a photograph in the front of the room of the Wrangell/St. Elias area showing, I think very clearly, this is a satellite photograph showing quite clearly the extent of the area that is covered by permanent ice. This is a photograph that was taken during the summer months.

For the record, I would like to submit a map, which could be inserted in the records at this point, which shows the extent of rock and ice in the Wrangells and also shows the relatively small area that can be termed habitable or useful for any human purpose, and what I'm passing forward is a copy for the record. There are a couple of Xerox copies there for members of the staff.

Mr. HARVEY. Can you define something for me? You said useful for any human purpose. What did you mean by that?

Mr. SHANE. OK. What I mean is that much of the Wrangell region, most of—essentially, all the area you see in white on the map in front of you, which is the bulk of the area, is very high in snow and ice, it's very rugged. It is useful, it is of interest to people as scenery, generally because it is viewed from lower locations. It is used by people, mountain climbers and so forth, geological research, and conceivably, in the long term future, could have some resource interests. But for the most part, when we're talking about the Wrangell Mountains region, we're talking about a relatively small area. The map is misleading, and if you look at the map, it's really the area within the Chitina Valley, along the river drainages to the north side of the Wrangell crest, and any proposal for land use which does not recognize the distinction between snow and ice in the lower areas can be misleading.

For example, you could create a very large park in the Wrangells and really not include any of the areas of controversy or of interest to any of the parties. The second point I'd like to make is that—is to address some of the factors that unify the Wrangell region from a human perspective. The first such factor, I think, is wilderness, and I'd like to submit also for the record and ask that it be included in the text at this point, another map entitled "Wilderness," showing areas which, in the judgment of my years of research, do qualify under the definitions of the Wilderness Act for potential wilderness classification and areas which do not. This map shows that the great bulk of the area does qualify as wilderness.

We're talking about an area that is relatively near the population centers of the State. It's also an area that, in the past, has supported mining and other settlements. Yet surprisingly, we find large expanses—and I'm talking now about areas not covered by snow and ice, in the Wrangell Mountains, which have very high wilderness values. There are some parts of the Wrangells, for example, virtually the entirety of the eastern Chugach Range, which on the map there is everything south of the very dominant Chitina River, which are as wild as any place in Alaska. Wilder than most places, even places in northern Alaska or the Brooks Range. It's an accident of topography and the rugged terrain. So when you're talking about the scale of very undisturbed wilderness, there are large areas, especially the eastern Chugach Range, which are extensive, undisturbed terrain, habitable areas from the point of view of recreation, which have as a primary value being extensive wilderness area.

The second unifying feature I'd like to talk about is the Chitina Valley. If you look at the maps of the area, or most expecially, the photographs, you find that the dominant feature is a very substantial valley, penetrating deep into the ice. It's about 100 miles long and it's the valley of the Chitina River. Six of the 10 highest peaks in North America drain into the Chitina Valley. It is the great valley of Alaska from a scenic point of view. A number of very substantial canyons penetrate into the mountain core from the Chitina Valley, including the Chitistone Canyon, Tonsina Canyon, Canyon Creek Canyon and others, so you're talking about a unifying factor of the entire Chitina Valley, penetrating into the ice cap. A 100 mile long valley, which is really one of the scenic spectaculars and climaxes of the entire world. A third factor which unifies the area is—and this, now, unifies really the whole area to the north of the Wrangell crest, is the—what we call habitable uplands north of the Wrangell crest. The whole Mentasta Mountain area. This is an area which is one of the most important in the State, from the point of view of backcountry recreation. It's relatively accessible to hikers and horsepackers. It's some of the best horsepacking country in Alaska and it has or has the potential for very extensive trail systems, trail systems running virtually from the Canadian border, through the Chisana area, over to Nabesna and on west. You're talking about very long trails, you're talking about country without a great deal of brush. You're talking about very scenic country, not as rugged as in the Chitina Valley, but on the other hand, also much more available for many people over the course of the coming decades from the perspective of backcountry use, whether it be hunting, hiking, horsepacking, photography, and so forth, and it's unified by a series of passes and trails, which make it really into one very large wilderness quality recreation area.

Now that I've talked about some of the underlying unifying factors of the Wrangells and the limitation imposed by snow and ice, I'd like to turn it over to Rich Gordon, who will discuss more specifically the scenic values of the region.

Mr. GORDON. I'd first like to bring up to the table here, two maps, if I might. This is for your use, one for each of you. This map indicates sort of the flip side of the map showing the ice and snow. This shows the usable areas for people and for wildlife. It's a map that I've prepared for the environmental impact statements when I was working for the Parks Service.

The second map, which I haven't had time to reproduce, I would request that you use during this discussion and then give it back to me and I'll give you a copy of it later. It shows for the heartland of the Wrangells or at least the central portion, the key wildlife values and the key—on the north side, the key mineralized zones. The wildlife value information came from local guides and the Department of Fish and Game. The mineral information came from extensive personal discussions with Don Richter, U.S. Geological Survey, who did the Nabesna quadrangle study and the information on here is restricted to that quad and its immediate environment.

Let me continue with the unifying factors first. The map will indicate the separate regional values, which I will discuss, but the area is unified also. I would say the first factor of unification is the fact that you have the enormous mountain massive, with vast glaciers, which is the predominant impression of human experience from anywhere, even along the periphery of the region. This is the largest totally unified region, I would say, in the State. It basically goes, on the north, the Alaska Highway, on the east, the Alaska Highway, which parallels the eastern edge of the Kluane National Park, which is part of the same—the eastern part of the same massive icefield group. On the west, the various highways that run along the western edge and the Great Copper River Canyon on the lower end. On the south, the Gulf of Alaska. It's a very thoroughly defined region.

The predominant impression anywhere in the region, if you can look out, is this great mountain massive, and the flip side of that coin is that it is a very active area, geologically. Anybody can see geologic processes in operation. There are dramatic things happening today. There are dramatic things that have happened. Just to illustrate three of them, Mount Wrangell, which is one of the volcanoes visible from the highway, is heating up. It is an active volcano. There is evidence, geomorphic evidence, of recent mudflows that have come off of Mount Wrangell and rolled all the way down into the Copper River Valley and across it in fairly recent times. It could happen again. On the southeastern edge, the Hubbard Glacier, which is probably the most spectacular glacier in the entire State of Alaska, is advancing slowly in upper Yakutat Bay.

It is expected probably to block off the Fjords system going off of Yakutat Bay to the east, the Russell/Nunatak Fjords systems, and if so, it will effectively isolate the immediate Yakutat area by causing a great glacial river to flow down what is now a small fishing stream, the Setuk River. These thing are happening today. The rivers that flow out of the Wrangells in all directions onto the lowlands are enormous, wide, braided glacial streams, actively depositing, actively broadening their alluvial valleys, changing from year to year. An example of this is in the portion of the Chitna Valley where Ben Shane spent the winter. The Chitistone River, which is a tributary of the Chitna, in the last few years has actively cut back onto the inhabited portion of the lower Chitistone—or the area just below the lower Chitistone Canyon and it has actually flooded the land around some people's cabins and this is in a valley, the lower part of which is a mile wide.

The wilderness has already been mentioned. The central feeling of the uplands, the sense you get, even in the lowlands, is that this is a Pleistocene environment. Man is almost sort of a temporary part of the picture. The ice can come back. This is, perhaps, most evident along the coastal portion of this area. In that regard, I will start my unit—regional unit analysis, and you have the maps in front of you. In this area, I will not describe specific landscape units. They are visible on that map back there. The ones that I think are most outstanding are presented. That will be submitted eventually for the record. Let me must briefly discuss the region. On the north, we'll move from north to south. This will include the—what is now proposed as the Tetlin Refuge.

In the north, the Upper Tanana Valley is composed of the great alluvial flat that has formed where the Nabesna and Shushana Rivers that flow south from the Wrangells enter the lowlands, and it is and area with a foreground that is visible from the Alaska

Highway. The Alaska Highway runs along the hills at the north end of the Tetlin Flats. You look across the Tetlin Flats at the Eastern Alaska Range, the Mensilton Mountains, behind the Eastern Alaska Range, actually visible through some of the canyons. You can just see hints of it, the great snow peaks of the Wrangells. It—in case I forget to mention it later, the portion of the Alaska Highway running through the Tetlin Flats, along the edge of it, I think is the best portion of the Alaska Highway for people to observe wildlife. The entire highway from Canada to Fairbanks.

The second major portion—major region, and I'm using this map when I'm talking about areas that are usable by people, is the area unified by the Slana, Nabesna Road, Slana being on the main Alaska paved highway System, the Glenn Highway. It enters the Wrangells very similarly to the trough into the Chitna Valley, except there isn't quite such a striking valley on this side. It runs southeast and it is one of the the two major human access surface corridors in the Wrangells. There's a gravel road, which in some years is passable by normal vehicles. In other years, you need a four-wheel drive to get into the upper part of it. It enters into an area where the Alaska Range borders very closely the high Wrangell Mountains and you simply have a narrow trough, the Trachundra Trough, which is a fault line separating the two. To the southeast, the continuation of this fault zone goes through a low pass, relatively low pass, into a basin which is number two on this map, the Shushana/Beaver Creek/Lake River basin. This is entirely surrounded by mountains.

As Mr. Shane indicated, the mountains on the north side are passable through low passes. The—I want to set the scale here. The—what we call the foothills, around the mountains, along the ocean, the Mentasta and Mensilton Mountains, the Alaska Range on the north side, are called foothills. These foothills, so-called, are about equivalent in structure and character and appearance and size to the High Sierras of California. These foothills are rugged high mountains, but they are traversable. One characteristic of this eastern basin country is that it is in a rain shadow because of the high mountains that draw out the precipitation from the coast. Consequently, there is less brush, less thick vegetation than in most other parts of Alaska, which makes travel much easier. Also that whole basin area is at a very high elevation. It's probably the highest extensive basin area in the State, 2,500 to 3,500 feet. Therefore, you are fairly close to timberline. In the whole area, this whole basin has a very open, accessible, available, friendly appearance. Through the northern part of that basin, flowing from west to east, is Beaver Creek. This is the only major clear water stream in the entire region, most of them being highly glaciated. It is a fine fishing stream, it's a good float stream, except for access problems and it defines the upper portion of this basin.

The White River Valley defines the lower portion or the—that should be southern portion. I don't mean lower in elevation, portion of this basin, and it contrasts with Beaver Creek, which is a fairly intimate, small, narrow valley. It is vast. The river alluvial flats are 2 to 3 miles wide. The visual appearance of looking out into this basin, there are many small ranges of flat-topped, mesa-like mountains. They rise 7,500 feet, they're mountains, steep-sided, fairly flat on top, multilayered volcanic rock primarily, separated by very, very accessible low passes and divides, easy country to travel in. In the background, mountains of the Saint Elias Range, which rise 13,000 to 16,000 feet, very jagged. In the middle ground or in the foreground from many places are a series of lakes set into these sub-alpine hills. Again, the views are open. Scattered trees, a lot of cottonwood or aspen, openviews, easily traveled country, a very friendly country, and it is probably the most wildernesslike portion of the lowlands of the Wrangells. It is very remote, inaccessible, not much has been done to it in terms of surface transportation. It is easily accessible by air. There are a number of hunting camps in the area, but even the guides look at it as an exceptionally primitive experience for their clients.

The area indicated as No. 3 on this map is, as I indicated, the Slana/Nabesna corridor, but surrounding or going to the southwest around the western frame of the Wrangells, the area I have numbered 3A in pencil on that map, this is an apron. It is a unique landscape in Alaska in that the road which follows the Copper River in that big U-shaped arc along the western edge has open views across the Copper River to an apron which rises gently from about 2,000 feet in elevation, very, very evenly over many, many miles, to the base of the actual summits of these great snow peaks. It is one of the classic examples of a visual experience where you have the extensive foreground, but here, evenly, gently sloping, covering a vast area from one north to south strip for around 60 miles, with the great snow peaks behind it. When you get into it, you find that there are a number of very dramatic canyons in the upper portion of the volcanic deposits, which are—tend to have a lot of red rock in them, U-shaped glacial canyons and again, rather accessible, because there are broad gravel flats on the rivers that you can land float—you can land small wheeled aircraft on.

The other aspect, however, of this broad apron or the eastern edge of it, No. 3 on the map, is that there are several lakes set into this area, visible at a distance from the Slana/Nabesna road corridor. Denial Lake is the most striking of these lakes. There are a number of smaller lakes, and that country is also—in other words, No. 3 is also somewhat like No. 2 in that you have different terraces, mesas, some of which rise to 9,000 feet, right up onto the ice of the high peaks and they're cut by deep, U-shaped canyons with castleated, crinolated cliffs on the walls, easily traversable by foot. Probably this will be the heaviest, or one of the heaviest, recreational use areas. It's very, very accessible by foot. The fringes of it are accessible by road and it also, as I will get into later, has extensive wildlife populations.

No. 4 the Chitna Valley, Mr. Shane has indicated, but I simply would want to point out that there are certain viewpoints, most notably the Kuskulana River Valley, which is just about where I have my "X" on the map that shows Chitna. It's just a short ways, well, 20 miles, 15 miles, east from Chitna. That valley has a jeep road up it right now. From the head of that valley, one would have an opportunity to see in one place the extensive glacier which is enclosed in rather steepsided walls, so you have a visual corridor, a high, rocky, multilayered volcanic cliff, Castle Mountain in the vicinity, a black lava layer, and behind it, the great 16,000 foot snow dome of Mount Blackburn, one of the great visual experiences of Alaska.

At the head of the Chitna Valley are the canyon systems and there's basically a triangle of canyons completely surrounded except at the outlet end, the—where the Chitna Valley broadens out, by mountains of fifteen to—15,000 feet high. The Chitna—Chitistone Canyon, which is the southern east/west arm of the triangle, more or less east/west, is a—the classic example in Alaska of an area, flat-floored, almost vertical-sided, with the walls very close to each other or, well, within a mile, mile and a half of each other. Very high, very sheer sedimentary rocks and a mixture of sedimentary rocks and greenstone volcanic rock, which is layered. It tends to be rather light-colored, tawny, cream-colored, yellowish, very colorful. It gives you—it leads the eye towards the Chitistone Gorge at the upper end, where there is a waterfall. Just a classic complementation of elements, which from higher points on the sides of the canyon or from the top of the rim, you can see these great snow peaks.

The western north/south flowing part of this triangle is the Nizina Canyon. There is an easy access point, a primitive road at present, although one proposes that this could be made into a horse trail and hiking trail, from McCarthy, a relatively short distance up to a place called Nikolai Ridge. From Nikolai Ridge, you are looking directly down what are called the Mile High Cliffs, directly into the Nizina Canyon and directly across, up the Chitistone Canyon. Probably the great, easily accessible view in the area. The Nizina Canyon ends in a broad glacier.

The northern arm of this triangle is the Skolai Valley, which is very different from the other two arms. It is a high alpine, grass-floored valley. There is a good deal of color in the rock outcrops. There are—it's—I call it the Valley of the Alcoves. On a massive scale, on the south side of the Skolai Valley, there are a number of enormous cliffs, enormous in terms of vertical scale, with white glaciated, very little rock on them. They tend to be rounded like this and you can look into them, one right after the other, from the floor of the valley. The mountains somewhat remind me in terms of the Canadian Rockies, although the geology is totally different.

One other canyon I forgot to mention is very important, and it's unique in the Wrangells. On the 3A, the apron on the west side. Most of the canyons are high up, back into the mountains. There is one area of great geological interest. It's unique in the region, at least, and probably in the State. There were, as I mentioned, great mud flows that came off of Mount Wrangell. They carried with them large blocks of rock, light-colored volcanic rock, diorites and so forth. In the lower portion of that apron, all of the valleys are inside, but it's gentle, vegetated sort of country.

In one valley which, by the way, is in an area of State selections and if the State should, by some chance, get this area, I would strongly recommend that this valley be left in park preserve or park. The Cretaslina River and its east fork above the junction are canyons carved into this mudstone. Visually, from at least one place, they are rather suggestive—they are suggestive of the Yellowstone Canyon, except no waterfall, a mixture of yellow rock, that is, erosional features in the rock, intrusions of different types of lava, varying from white to red, and the overall appearance of this mud flow, which is a very multicolored sort of a flow, very, very spectacular canyon and geologically of great significance.

OK. On the south side of the Chitna Valley, although physically is one valley, is really very different in that the north side is accessible, fairly flat bottom, a lot of rock outlays that make it quite attractive. The south side of the valley is fairly remote. The river, Chitna River, tends to flow fairly close to the south wall of the valley. South of the Chitna River are a series of interlaced valleys, which are excellent for horse travel, but the country—or at least one of the valleys, the Hanagita Valley, is excellent for horse travel, but the country tends to be brushier. The country tends to be a good deal less traversable than the north slope and the west slope of the Wrangells, which are drier. There is one lake basin which is outstanding in that you have a small basin with three lakes, the Tebay Lakes, backed by high glacial peaks which have the coastal character, because the rain forest influence gets up into the edge of them, and the rock outcrops are a peculiar quality outcrop of rounded bedrock throughout the valley, so you have hundreds of little blue terns throughout this basin. You have bedrock outcrops, little tiny hammocky bedrock outcrops, these lakes with the glaciers behind them, the visual setting of which is a combination of features within a fairly small geographical area, which I think is the outstanding representation of this type of landscape in the State.

Well, when you leave the Tebay Lakes, perhaps this is the natural way to look at it, you go over a tremendous waterfall down into the Bremner River Valley. The Bremner River Valley, which is immediate—which is not numbered on here for some reason. Oh, I guess it's because I didn't look at it as an acceptable human use area, but it is low valley land. It is ecologically very significant as a transition between boreal forests and coastal forests, and it has one of the most wild and hairy float streams in the State. The valley is also significant in the same way that the Andreafsky Valley, I've talked about the Kisaralik Valley, other wilderness, the complete drainage systems, lowlands surrounded by mountains except—well, essentially completely surrounded by mountains, except the Copper River Canyon on the west end, which is virtually undisturbed by man. There's one small gold mine at one of the headwaters, which hasn't been active for a while. Other than that, it's totally undisturbed.

The Copper River Canyon, which is at the southern end, it's part of this No. 6, but I don't have the No. 6 showing in the canyon. The lower Copper River Canyon is a world unto itself. It is the largest of the rivers that cut through the coast range of Alaska. It is the only one that's entirely in the State, from the upper end of the canyon to the lower end. Each one of them, and we've talked about some already, have spectacular scenery. This one is unified in two respects. The scenery, the visual enclosure is more continuous. The side valleys are very, very small. You have a sense, when you travel the river, of being in another world, with mountains and very, very steepsided mountains rising 6,000 to 7,000 feet directly on both sides of this 4-mile-wide broad valley for a distance of—I don't know how long it is, 50, 60 miles long.

It is the classic example in the State probably of a sequential region of terrains, because the river is relatively gentle. It is not difficult to float, and you have a moving visual platform from which to experience it. You enter it at the northern end through a deep, rock-walled gorge called Wood Canyon. Before you come out at the south end, you go through a place called Miles Lake, which has a glacier coming into it, and then I remember the old radio program talking about the trip, the railroad roars through this tunnel and finally comes into Grand Central Station. The last bit of this canyon, you go at a rather rapid pace along the river, immediately adjacent to the face of the Childs Glacier, which cave directly into the river and you have to be—hope and pray you don't have a big icefall falling down on top of you. You're right up against the glacier, whipping along this river and then you break out of the canyon. Finally, the Copper Delta, we will discuss separately, but it obviously relates to this visually. It is the largest delta of any of the rivers cutting through the Coast Range. To the east, I will simply address the portion that's proposed in the Wrangell Park for the moment, and that is the Malaspina or Manby Coast, No. 7.

The great Piedmont Glacier, that is, the glacier which is covering flat land flowing out of the mountain, is the Malaspina Glacier, which covers, as people like to say, large areas in Rhode Island, so what? It is visible from the air. It is visible from the mountain regions at some distance. It is flat. Its moraines actually that push right out into the sea. The vegetation is immature. There is not, as far as I can tell, a stick of mature timber there. There are spruce trees and there is quasi-commercial forest, I suppose, but no mature forests. It is a very dynamic environment, changing by the day, because of the enormous amounts of water flowing out from this tremendous glacier. It is—in a way, well, OK, it is separated from the Yakutat Forelands by the area I've already mentioned, Yakutat Bay, the upper portion of which is called Disenchantment Bay, and at the head of it is the Hubbard Glacier. That basin, on an enormous scale, is an awesome visual experience. When you go up by boat, the upper portion, the Disenchantment Bay portion gives you the feeling of a basin surrounded by mountain peaks, 15,000 to 18,000 feet high, directly rising above the glacier from the water. You can see every one of these mountains when you're on that boat. It's an unbelievable visual experience and the Hubbard Glacier, like I say, is certainly the most active of the tidewater glaciers in Alaska. It equals in size the Columbia Glacier, although I think the face of it is several hundred feet higher, and it is slowly, inexorably advancing at the moment.

I want to make an analogy between the Malaspina Coast and the Yakutat Forelands. The Malaspina Coast is the Pleistocene. If you want to experience the Ice Age in the lowlands today, go to the Malaspina Coast. It is still in the Ice Age, even when you're standing on the beach. The Yakutat Forelands, which is an area where there are scattered stands of maturing timber, a lot of marsh, open beach, is an area, you might say, that is 1,000 years out of the Ice Age, but the Ice Age presence is still around. It's a degree of succession. That experience is very powerfully felt when you are there. That, I think, outlines the region, but let me emphasize again the unity of this area and the fact that there are processes which are visible throughout the entire area. Thank you.

Mr. **Shane**. I'd like to make a couple of brief comments on the land status in the Chitna Valley that might be useful—and some of the lines drawn on the map that might be useful to the staff, as you try to understand how all these lines were derived. It's interesting in the Chitna Valley that the (d)(1) and (d)(2) division is important. In many places in the State, the (d)(2) lands can be considered to be the core area or the area of highest interest for park or refuge purposes. In the Chitna Valley, it's actually reversed. The (d)(1) land is the land of most interest for park purposes. The (d)(2) land is really fairly north of the Chitna River, almost entirely snow and ice. Now, if you'll look at the various proposals for the Chitna Valley, there seems to be a growing consensus among them that on a boundary—and you can see it on the map behind you, if they've—the different boundaries vary slightly, but they tend to make large exclusions from the park, which would be additions, I guess, to an actual preserve, in the middle and upper parts of the valley. Now, it's important to realize that these exclusions cover almost all—not all, but almost all of the lands of interest from the point of view of habitat, recreation, scenic values. So that it's in no way inclusion which leaves in the park, the scenic core.

The second point I'd like to make regards a little finger that sticks out into that exclusion, and that's the finger that contains the Chitistone and Nizina drainages. That boundary was drawn, and it's pretty much the same in most of the proposals now, was drawn——

Mr. **Harvey**. That one right there?

Mr. **Shane**. Yes, Yes; it's drawn to include the entire Chitistone drainage and it's drawn in such a way that, visually, the entire Chitistone country is within the park and therefore it comes a little bit further south than the limit of the actual Chitistone River, itself. It also includes the Mile High Cliffs, which face on the Chitistone Delta, so that it's just a little tiny finger going into the preserve, but its acreage is—does not reflect its importance. You're talking about a very, very key aspect of the Wrangell Park. The way the various boundaries are drawn usually is that Nikolai Pass, which is the pass near McCarthy that overlooks the Chitistone, is usually on the edge of the park or just in it by a few miles, and if you look at the geography of the place, it looks like in the long run, that pass is going to be the critical viewpoint for visitors and that's the reason why the boundaries are drawn that way.

Mr. **Harvey**. Any more comments? Yes?

Mr. **Graham**. Mr. Chairman, Hatch Graham of the Forest Service. I don't think I can elaborate any more on the scenic qualities, except to offer the fact that the Wrangell Mountains area is extremely accessible and makes these viewing opportunities more available to more people than many of the other outstanding areas in Alaska. In studies that the Forest Service has done, we have enumerated a number of the scenic qualities and we have prepared this area guide for the Copper River Wrangells, which I would make available for the record, that inculdes not only scenic aspects, but a rundown on all the other resources.

Mr. HARVEY. Yes: you can—we'll note that that's in the record, because we've got a large backup. Yes?

Mr. WRIGHT. Mr. Chairman, Jerry Wright, National Park Service. I, too, will avoid redundancy and only highlight a few of the integrative factors. I'd really like to point out, first of all, that the—this area—the scenic value of this area has long been recognized. The National Park Service has been studying it since 1938. In 1940, the Chitna Valley and the very same Chitistone Canyon was, in fact, proposed as a national monument and it was really only the advent of World War II that precluded President Roosevelt from issuing a proclamation to that effect. Since then, there have been several National Park Service studies within the—primarily inside the Chitna Valley area, in the 1950's and 1960's, culminating in the recent studies in response to ANCSA.

I'd like to amplify a little bit about what Mr. Gordon and Mr. Shane brought up on the unifying factors. I think it's important to realize that since this area is definable by natural boundaries, a major value is that it can be considered somewhat ecologically isolated from other areas surrounding it. The disruptions on land areas outside it really don't have an impact on the areas within the region.

In strictly ecological terms, there's not very much transfer across its boundary. You know, as an instance, using the landslide imagery, there are several rivers in the area, but the six major rivers that drain the area, only one, the Copper, gathers any of its waters from outside the region. There is a diversive ray of vegetational communites, which we have mapped and analyzed in the joint studies with Hatch Graham of the Forest Service, and I won't go into detail, only to point out that there are three major types represented, the alpine tundra, identifiable on that map, which is, for the record, a landslide image—images, at approximately 1,000 to 250,000 scale. The alpine tundra, the high tundra, indentifiable by the lighter red; the boreal forest in the Chitna Valley and the northern areas by the dark red; and down along the coast, the remnants of the cultural forest that Mr. Gordon alluded to, and in the Bremner by the bright red. To give some definition to the figures, we have calculated that for the entire Wrangells region, 38 percent is, indeed, ice, 35 percent is barren rocks. If my addition is correct, that leaves about 27 percent remaining vegetative.

I'd like to further point out that the region provides a unique laboratory where not only such of these ecological processes can be studied, but the goelogical ones as well. The—as is easily understood by looking at the map, the recession and advances of the glaciers are the dominant forces operating in the area. I think the area offers one of the finest examples in the entire world of the influences of glaciation. Modifications of the landscape by glacial action are displayed everywhere, and I won't go into specifics on the superlatives attached to the glaciers, but they are the longest and they are the largest, et cetera.

Briefly, again, to look at—Mr. Gordon emphasized the dynamics that are occurring, giving us an example of Hubbard Glacier. Icy Bay offers another example, as recently as two hundred years ago. The entire width of Icy Bay was filled by the three active glaciers within it, having extended well out into the Gulf of Alaska. There is very little reason to believe that this would not happen again. Ecological processes are very dynamic, very contemporary. Because of the fact that you have a largely well-defined ecologically isolated area, you have the opportunity to look at complete food chains, intact, to look at processes such as predation, free from the manipulative influences of man. It's rare, indeed to find in the world today, places where these processes can be looked at in such isolation. I think, with that, I will conclude.

Mr. HARVEY. OK. Thank you. Yes, sir, go ahead.

Mr. DAPKUS. Dave Dapkus, Heritage Conservation and Recreation Service. I'd like to talk about three rivers that are—that we proposed within the Wrangells area, and some of the values. For all three of them, one of the big values has already been covered, the scenery. The first river I'd like to talk about is the Copper, and the only thing I want to add to the scenery is the thrill that it is, going down the Copper in a boat and coming up to Miles and Childs Glaciers and not only watching the ice come down into the water, but hoping like hell that it doesn't flood your boat. But it is a beautiful site, particularly for people from the outside and for most of us who have never been there. It's really quite beautiful.

One of the important things, I think, on the Copper that makes it valuable is its history and that is tied into the Kennecott Copper Mine that operated in 1911 to 1938, and the fact that you had the old railroad that came up and can be seen and the old trestles that can be seen from the river. It also has good wildlife values. In fact, you can see harbor seals in the lower part of the river. From there, I'll go to talk about two other rivers that are tributaries to the Copper. One is the Chitna, which drains—is the central draining river of the Wrangells.

There again, its scenery, all the big mountains, make it highly valuable as a river. Its history, again, the Kennecott Copper Mine and the fact that sternwheelers ran up there till they wore out, and that the railroad has come up adds to its value. I would also like to mention, as a recreational river, both of them are relatively easy to go down in rafts and riverboats. The last one I'll talk about is the Bremner, which is much, much smaller and the scenery, here again, is important. It's of great value. Its wildlife is another one. The delta is a nesting area for trumpeter swans, which makes it quite valuable. Recreation is probably its biggest thing. It's got a lot of four and five water in the upper half of the river and as far as I know, we didn't do it, no one has run 12-mile canyon. It's quite rugged. It's waiting there for one of the more adventuresome people to float down through.

Mr. HARVEY. Jack.

Mr. HESSION. I'd like to supplement Mr. Dapkus' observations and also Mr. Gordon's. I don't think the Alaska Coalition would like to leave the committee with the impression that clear water streams are the ultimate. They're not. Generally, clear water streams tend to be—have less of a gradient, while glacial streams, as their origin will suggest, tend to be friskier, a little bit faster moving and, therefore, more interesting from the standpoint of just pure recreation experience, and in the Wrangells, I could list a dozen, but I'll just name half a dozen that are, I think, important recreational resources.

On the west, you have the Tonsina, the Klutina, Nelchina, Tazlina system. On the east side, you have the white rivers, Chisard, Nabesna and Beaver Creek, Beaver Creek being the exception, in that it's clear, and on the west again, the Bremner, which has been talked about. But in terms of the committee's interests in controversy and conflicts, let me make some observations on the Chitna/Copper system. A focal point of controversy is there, of course, the transportation aspect. As Mr. Gordon noted, the Copper is unique in that it's the only major river reaching the coastal mountain ranges that's entirely within the United States. The others, of course, being the Alsek, Katshinsheenee, the Taku and the Stikine, all of whose upper watersheds are in Canada, of course, and by the way, the lower watersheds are the focus of similar transportation conflicts. Copper is—I'm now talking about the Chitna/Copper system as an important scientific resource, in that it has an ecological transect, as Mr. Gordon mentioned. I don't think the wildlife was stressed enough. Many wilderness species can be seen along the river.

Mr. HARVEY. We're going to hit the wildlife later.

Mr. HESSION. OK. I just wanted to concentrate on the wildlife resources associated with the river. The Copper is perhaps unique in the region in that several wilderness species can be observed along it, wolves, brown grizzly, bald eagle and, incidentally, the trumpeter swan's critical habitat in the Bremner was the site of the rediscovery of that species in Alaska. Recreationally, you can start at McCarthy, which is in the heart of the Wrangells, run down the Kennecott, the Nizina, the Chitna, and the Copper, all the way to Cordova and at both ends you have excellent access, air, ferry, roads, and as such, you can thereby traverse the entire region and sample its exceptional diversity. I think I'll stop there. Thank you.

Mr. HARVEY. Yes?

Mr. CONTOR. Roger Contor of the National Park Service. I think we should mention here that for a number of years, the Administration has talked with the Canadian government on the possibility of the Kluane National Park, which is some 5 million acres in size, right against the boundary here, being joined with this to be one of the—it would be the outstanding international park in the world if this takes place. They haven't accepted yet.

Mr. HARVEY. Any more comments on the scenic and recreation? Yes; Dave?

Mr. DAPKUS. Dave Dapkus, Heritage Conservation and Recreation Service. One thing I didn't point out that should be, in speaking of the Chitna and the Copper, is that their access is relatively easy, particularly the Copper and both are heavily used every year and have been for years and years, at least by Alaska standards, as opposed to the lower 48. Lots of people go down it, lots of people use it, both in big and small groups.

Mr. HARVEY. Thank you.

Mr. BEVINETTO. I would ask Mr. Contor what the land status is, to his knowledge, on the Canadian side?

Mr. CONTOR. That is all Crown lands.

Mr. BEVINETTO. Crown lands?

Mr. CONTOR. And it is a designated national park from about Mount Bear, south, adjoining the proposed area in Alaska. From Mount Bear north is a wildlife refuge at this time.

Mr. BEVINETTO. Thank you.

Mr. GRAHAM. Mr. Chairman?

Mr. HARVEY. Yes?

Mr. GRAHAM. Hatch Graham with the Forest Service. I'm not sure in my brief remarks earlier, I made clear the point of—on access. We've been talking about rafting and river transportation and so on, but I think that I want to really emphasize that in all the places where people can go for scenic values by car, maybe even a wheelchair, this is still one of the more accessible areas by conventional surface means.

Mr. HARVEY. Any other comments?

Mr. GORDON. Just a very brief comment. We were talking about access and I just wanted to point out a recommendation that the Park Service and the Forest Service, in cooperation, made which is in the Environmental Impact Statement during the Morton days. I hope this doesn't slip between the cracks in the Andrus proposal, and that is that in the Chitna Valley and in the lower Copper Valley, adjacent, downstream from it, we recommended that there be an intensive cooperative, multidiscipline, multimodal study, focused primarily on the whole matter of access and transportation, not just roads, but all aspects of it, and involving, if possible, the Chugach Corp. which will own an extensive amount of land along the lower portion of that Copper River Canyon, the Atenuk Corp., which will own an extensive amount of land in the lower Chitna Valley and the Chitna Village, holdings in the Wood Canyon portion, the upper Copper River Canyon. The State of Alaska Department of Transportation, Department of Fish and Game, and Department of Natural Resources, frankly, to be blunt, about it, we're a little concerned that the Department of Transportation in this State is not working totally in cooperation with the Hammond administration and I hate to be blunt, but in any event, all of these organizations, working together to—in somewhat the same way as the Alaska Peninsula study, only with one difference, namely, that the land status is going to be firmed up immediately. I just want to point out that some sort of authorization——

Mr. HARVEY. We can get into that detail later.

Anything more on the scenic? All right. Let's talk about wildlife. Who wants to talk about wildlife and their uses? Go ahead.

Mr. MCCURDY. Mike McCurdy, Department of Fish and Game, to address the upper Copper River in general. The upper Copper River supports numerous individual populations of sockeye and king salmon, which in turn support a substantial drift gill net fishery off the mouth of the Copper River. Our activities up there at present include foot surveys for age structure of the returning populations of sockeye, plus their—the numbers of escapement, an index of escapement. We also, this coming season, hope to install a solar counting site at mile 52 by the Million Dollar Bridge or just below the Million Dollar Bridge for sockeye enumeration, escapement enumeration. This will be one of the—this will be the first time a total—a good total estimate of escapement has been attempted on that particular system. Further, Copper River populations of the sockeye and kings and to some extent steelhead, supported also an extensive subsistence fishery in the Chitna/Glenallen area. Thousands of individuals come down there annually to fish, fish wheels and dip nets. I guess that's just about it with the Department of Fish and Game activities.

Mr. LEEDY. Bob Leedy, Fish and Wildlife Service. In 1975, the Bremner River had a population of 56 pairs of breeding trumpeter swans, making it highly unique for a small area. It also has a good moose population, numbers unknown, especially in the lower portions in the valley and although access is extremely difficult to the area, only by riverboat in some of the lower sections, helicopters, perhaps supercubs in the upper sections, it is a relatively constricted area with wildlife exceptionally easy to find and see.

Mr. HARVEY. Any other comments on the wildlife values? Yes, go ahead.

Mr. OLSON. My name is Sig Olson, with the Forest Service, and I'd just like to point out a few of the highlights relative to the wildlife populations that are there. As you might expect, the diversity of habitat described by Rich so well, ranging from coastal clear into the interior, gives you a wide range of wildlife species that you might not get elsewhere and not only in terms of coastal to interior, but in terms of the lowlands to some of the highest peaks in the world or in the Nation. Big game, it's, of course, probably best known for its sheep, plus or minus 10,000 in the Wrangell, Mentasta, Nizina areas. Average harvest, probably around 450, 500 sheep, depending on the year, and about 30 percent of these taken by nonresident hunters. Hunter success probably in the success of 25, 30 percent, depending—of course, this is for ram. Caribou, the Mentasta herd ranges in the area, approximately 2,000, 2,500 sheep–or caribou, rather. Principally on the slopes of Mount Wrangell and Mount Drum, there is an important calving area for this particular group on the west flank of the Wrangells, the Chisana herd on the other side, probably 1,000. These numbers may vary. The Fish and Game people may find differences in them but there is a small group there. Their calving area, which is important, is in the White River/Beaver Creek area. Moose, variable. They—Not too many in the Chitna Valley and south of the Chitina River, matter of fact, not much is known about moose in that area, except that they are fairly sparse. Probably the best habitat being on the west flank of the Wrangells.

I think we have a problem or a—I don't know if you'd call it a problem or not, but there is a situation that impinges on fire, the fact that maybe in years past, when fire control was not quite as good as it is today, we may have had more moose, by virtue of the fact that we had more fire, creating better habitat in certain areas. Fire doesn't necessarily—you can't just go broad across the board and say all fire is good. It is good when it's in the right area. But at any rate, moose are found in the Chitna Valley, on across the west slope, over into the Nebesna area. The general populations are not high, moderate, in some places, declining.

Two small bison herds, a 1950 transplant in the Copper River/Nizina area in general, 80 to 100 bison in that area. In the Shushana River, about 25. They were planted up there in the early 1960's and there's a small herd up there. The Copper River herd does provide some hunting, permit hunts generally. Mountain goats are common, more common in the Chugach Mountains area and they range—they do range up in across the Chitna Valley and into the—that side of the Wrangells. Hunted fairly heavily out of McCarthy and on the Chitna Valley, I can't give you any figure on just how many. Black bear are fairly common throughout the lowlands. Grizzlies range through the high country and they are fairly common, particularly in those areas that are more remote. We know that prospectors and hikers, alike, have has some very interesting encounters with these bears.

In the waterfowl situation, the wetlands in the Chitna Valley are not high producers, but constant, and I would say you could not detract from the fact that the water is—the water supply and the habitat there very little from year to year and so it is a constant producer, rather than a high producer. The Tetlin area, the same way. I believe the densities are approximately seven ducks per square mile in that area. Again, not the highest in the State, but due to the steady, stable habitat situation there, a constant producer each year. The trumpeter swan has been mentioned on the Bremner. Upland game species, grouse, ptarmigan, here and the various species that are available are—I hate to say cyclic, but they do go up and down and when they're plentiful, they're plentiful, and when they're not, why, you have to hunt something else. It's an important fur bearer area, lynx, martin, fox, wolverine, coyote and beaver, trapped by local people primarily. Wolves are relatively common. There's an interaction between—a prey/predator problem between moose, wolves in the area that the fish and game is working on. I'm not going to go into the fish situation. That's already been covered, and there is a sport fishery in the area, a good sport fishery resource, lake trout, rainbows, dolly varden verbit. I don't have an awful lot of facts on the area. I do know that approximately 5 percent of the larger lakes are good for spawning. Some of the other reasons are—there are some other reasons for not having too many opportunities for improving the sport fish population, by virtue of the fact that the lake aren't either well enough—their biology is not well enough known or there are reasons not to support good fish populations, shallow and—too shallow, for example.

I do want to bring out one thing about this area. We have stressed use, consumptive use, but there is a gain, a growing use in noncomsumptive use. People just enjoy wildlife, to see it. It's growing. One of the fastest growing uses of wildlife that we have, and I would be the last one to say that it should supercede, in any way, the consumption. Nevertheless, this is an important thing to realize. Particularly in an area that people can traverse by car, quite easily by foot, horseback and the opportunity to see animals is very important, and I just wanted to stress that.

Mr. HARVEY. Thank you very much. Yes?

Mr. ROGUSKI. Gene Roguski, Alaska Department of Fish and Game. I'd like to add a few more comments about the sport fishing values, principally in the Nabesna/Chitna area. As already has been mentioned, most of the larger rivers are glacial and therefore the sport fishing values are rather low. Some of the smaller, clear streams are excellent grayling angling. Hundreds of small lakes dot the lowlands and are generally poor fish producers. Many have never been surveyed, however. The lakes in the lower areas usually have popoulations of pike, grayling, whitefish, or verbit. Those lakes in the higher elevations of the Wrangell Mountains are characterized by cold, deep waters and their fish species usually include lake trout, grayling, and whitefish. Because of a short, open water season from early June to late September, which is about 2 months shorter than that of the lowlying lakes, and because these lakes have accessiblity generally only by float aircraft and a few trails, these levels remain low. A few examples of some of the better lakes in the area, Rock Lake, this is about a 2,700-acre lake. It's over 200 feet deep, which makes it the deepest or probably the deepest lake in the interior and it's also, by far, the most scenic lake in the area. Its fish species include lake trout, grayling and whitefish. Ptarmigan Lake, which is just north of Rock Lake and it's partially fed by waters from Rock Lake, has a surface area of about 650 acres. Its maximum depth is less than 40 feet. This lake has an excellent reputation for large lake trout and grayling. Tanana and Copper Lakes are probably the most utilized large lakes for sport fishing in this area, as they're only a few minutes away from the Nabesna Road and commercial operators are available to fly anglers to the lakes. Also adjacent to the Nabesna Road are some smaller lakes, Jack Lake, Long Lake, Twin Lakes, and these lakes have generally grayling, verbit and lake trout. Angling is relatively light. In the Chitna area, we have Hanagita and Tebay Lakes. These are in the same Chitna Drainage and Hanagita Lake has some rainbow trout, also steelhead, and both lakes have also grayling. These also are flyin lakes and very lightly used.

Mr. HARVEY. Yes?

Mr. LEEDY. I assume we are taking comments now on the Tetlin area?

Mr. HARVEY. Yes.

Mr. Leedy. OK. In the Tetlin lowlands—I mean, Tetlin/Northway lowlands, this is part of a larger area in which surveys are done annually by the Fish and Wildlife Service. The average density is 67 breeding ducks per square mile over the entire area, second in Alaska only to the Yukon Flats. Densities in good wetland habitat in the Tetlin lowlands, themselves, are far higher, often exceeding 200 ducks per square mile and in good habitat, have been known to exceed 600 ducks per square mile of habitat. There are 17 species of nesting ducks in the area, including redheaded, ring-necked ducks and green—and blue-winged teal, very seldom found in other parts of Alaska. Canada geese are common nesters along the Shushana River, itself. Cranes nest in the open wetlands and loons, grebes, scaups and many other water birds are common nesters in a variety of habitats. Bald eagles also nest in the area and the lake systems here may be the area of highest density of osprey nesting in the State. The annual fall flight of about 100,000 birds migrates to all U.S. flyways, Canada and Mexico.

The Tetlin basin and some other wetlands of interior Alaska and northern Canada are not subject to the periodic droughts which often—which occasionally plaque the tradtional duck factories down in the northern United States and prairie provisions. The displacement of breeding ducks into more permanent wetlands of

Alaska during periods of severe drought have been reported in 1959, 1968, and again in 1967. As an example, the 1977 population of breeding ducks in the Tetlin area increased to 50 percent over the 14 years average. Species of particular interest, due to declining populations, continental populations of hunter preference, such as mallards and canvasbacks, were up to as much as 50 to 60—well, up 61 percent for mallards, 82 percent for canvasbacks and the normal low population of 200 redheaded ducks went up to 14,500. This is not specifically for the Tetlin area, but in the broader area for surveying purposes, though redheads were far more common in the Tetlin area.

Now, a recent study by a Mike Stenler and Dr. Brian Kessler of the University of Alaska, on contract for Northwest Gas pipeline Co., confirms these population studies—population figures that were cited previously and also shed a great amount of light on populations within the Tetlin lowlands, themselves. They had five different areas, five different strata that they examined and the area of highest population concentration was Scotty Creek, followed by the Tanana/Shushana Valley. Scotty Creek is an area of wet—Scotty Creek Valley is an area of wetlands immediately adjacent to the Canadian border and transected by the Alcan Highway. Populations of all birds in the Scotty Creek pond and marsh habitat was 714 birds per square mile this last year, with production of 162 birds per square mile. In addition, dabbling ducks, those ducks of greatest interest to most people, hunters especially, reach their greatest abundance in the Scotty Creek area. Scotty Creek had the highest site diversity and the second highest community diversity. My reason for the specificity in the Scotty Creek area is that this is in direct conflict with lands on the State's wish list and I would be more than happy to discuss this conflict at a later time.

Mr. HARVEY. Yes?

Mr. ZAMBER. I'm Jerry Zamber with the Bureau of Land Management. I'd like to just provide a little historical significance related to Sig Olson's comments on fire. The area has very little lightning. Most of the threat from fire is man caused. It does not have a vast history of fires, like most areas in Alaska. Lieutenant Allen, at the turn of the century, indicated there were very few moose in the area and the Native populations, the Nikolai tribes were very hungry and I believe that's why they were willing to point out where they got their copper nuggets and copper mines up in the Chitna Valley.

Mr. GORDON. I want to focus on key wildlife. First of all, in the Copper River, I want to mention that the—there is an area at the mouth of the Bremner where it comes into the Copper, which is a major rusting area. There are some ponds right there. A major critical post-nesting resting area for adults and cygnets are critical pieces of habitat. The Copper River has goat populations on bluffs immediately adjacent to the river, which is rather unusual in Alaska and it also is an excellent viewing opportunity. The caribou—well, let me talk recently. In the White River, Beaver Creek, Shushana basin that I was talking about, the Shushana caribou herd calves. It's an important calving area, and the map I've given you, if you want to just refer to that map, it indicates the highest area of sheep concentration, based on what I've been told by the guides. The northern fringe of the Alaska Range, immediately north of the Beaver Creek, along the easternmost portion of the Alaska Range in Alaska, is a very important moose habitat. They seem to be particularly concentrated just at the base of the mountains, at the southernmost edge of the Tetlin Flats, and in the Wellesley Lakes area, which also is right near the Canadian border at the northern edge of the mountains, there's an exceptional concentration of dabbling ducks, particularly blue-winged teal.

The sheep is the major interest in the Wrangells probably. I'm sure this will be thoroughly discussed in detail by Fish and Game. There are about 11,000 to 12,000 sheep, I believe, by the latest census. There are three primary concentration areas for sheep hunting, which are of particular interest, although sheep are widely distributed. It's these three hunting areas which we want to, perhaps, focus on. No. 1, in the high mesa-like hills between the White River and Beaver Creek, particularly around Wiki Peak. As I say, the best sheep habitat is circled on the map there. It's an area of flying hunting and horseback hunting, wilderness type experience, but relatively easy country to hunt in. The second major area is in the Jacksina Creek, Tania basin area, immediately to the west of Nabesna, extending over to Nabesna. That is an area which is road accesible and it also is easy sheep hunting because of the topography, fairly flat-topped mountains, easy access up onto these plateaus. These sheep, of course, live on the rugged cliffs in between, but you can get to them. These areas are primarily valuable for accessibility of sheep, being able to get to the sheep. The third area is the upper Chitna Valley from McCall ridge, where the valley ceases to be a vast wide plain and becomes a fairly narrower, more canyonlike valley, from there up to the glaciers at the head of the Chitna. Some of the largest trophy heads in recent years come from the Hawkins Glacier, Byron Glacier area, way up at the head. So we're talking about those three areas as of most interest.

Now, there's four major objectives that—in terms of park service management and the Coalition certainly agrees with this, I guess, but we have had—tried to develop in the Wrangells. It's not easy to accommodate them all. No. 1, sheep hunting, for easy accessibility, fairly great likelihood of being able to get your sheep. I mentioned two areas where such opportunities are particularly important. Second, this is one of the perhaps two largest or most important areas in the State, or three most important areas in the State for very large trophy heads. I've mentioned one area which is critical for that. That's the second objective. Both of these are consumptive use objectives. This is the major existing use in the Wrangells today and it certainly seems reasonable that to the greatest extent possible, that continuation of that—of both of those uses, both of those types of sheep hunting should be provided for. The third objective is, as part of the great sanctuary, one of the five great sanctuaries in the State that I talked about, most of which in this case is in the Kluane Game Sanctuary and National Park within the game sanctuary in Canada, but extending over into the easternmost portion of the Wrangells. The extreme upper portion of the glaciated portion of the Chitna Valley, above Byron and Hawkins Glaciers, the White River Valley, which is directly adjacent to the lowlands, directly adjacent to Kluane National Park, that's the third objective.

The fourth objective, which Sig has alluded to, is the opportunity in areas that people can get to and use on foot and by horse, even road accessible, to be able to experience a part of their wilderness experience or even road experience, the opportunity to view large numbers of sheep. Now, let me point out a way of doing this. Basically, the proposal as submitted by the park service and Andrus proposal tried to deal with it in this way. The upper Chitna Valley would be open to trophy sheep hunting up to the Byron Glacier. The area that the Canadians are particularly concerned about is a little triangle of glacial valley bottomland, from which a lot of poaching, air poaching goes into Canada. They would like that area closed, so the minor—a very minor adjustment of the Andrus boundary, both of theses objectives, hopefully, have been taken care of. In regard to quantity or easy-access, easy-use sheep hunting, the concept is this, and it's not totally easy to do. Leave the best sheep habitat in the White River/Beaver Creek country open to sheep hunting, and that, as I say, is indicated clearly on that map. It's primarily around Wiki Peak, but at the same time, leave the White River water shed closed. This is going to affect primarily one guide and his family. We sort of split the area, leaving the part which is most immediately adjacent to Kluane Game Sanctuary, that's the southern half of this basin, the White River drainage, closed to hunting, but leaving the Wiki Peak areas or Beaver Creek, the southern Mensilton Mountains, where I've seen an awful lot of sheep, which is the northern half of this basin, leaving that open. So there's one area of easy hunting, easy air access which would be open. The third area, and this is in some conflict, is the Jacksina/Tania Creek area. You can drive along the Nabesna Road in favorable years and you can see—I have seen 70 sheep from that road, just coming into Nabesna, on the cliffs facing Nabesna. There should be an opportunity for people to be able to see sheep like that, an unhunted population. That is the easternmost portion of the Jacksina/Tania country. The Jacksina Canyon country, which you can walk right into from the end of the Nabesna Road, Tania Lake, Tania Creek drainage country, which you can walk into quite easily, although it's muskegy, from about 25 miles in on the Slana/Nabesna Road. This is probably the area that will receive, along with the upper Chitna Valley, one of the two areas that will receive the highest backpacking, hiking, this sort of use. The concept here is that the—this area is easy access, large concentrations of sheep, would be closed to sheep hunting in order that viewers would have one place in accessible country in the Wrangells to view sheep. Now, I realize Fish and Game would like to see all these areas open. I realize some conservationists would like to see all of them closed, and what I'm suggesting is that this particular division, perhaps, could best fit these four goals and meet all four of them. Thank you.

Mr. Bevinetto. Mr. Gordon?

Mr. Gordon. Yes, sir.

Mr. Bevinetto. When you say open or closed, do you mean the boundary?

Mr. GORDON. Open and closed to sport hunting. In this case, the park bound—park would be closed and the preserve would be open.

Mr. HARVEY. Yes?

Mr. ELLIS. My name is Bill Ellis, for APHA, Alaska Professional Hunters. The Wrangells are one of the State's best sheep areas and also they're one of our best hunting. They also help support more than 50 Alaskan guides and it's hard to tell how many assistant guides. A very large number of these 50 guides use the Wrangells for over 50 percent of their income, and for many, it's their sole source of income. The State recognizes their use of the Wrangells and has granted specific areas for guides to utilize for this renewable resource. Thank you.

Mr. HARVEY. Yes, sir?

Mr. JOHNSON. My name is Keith Johnson, I'm also from the APHA, and to lock up the Wrangell Mountains, I think would be a sin and I'd like to go on record opposed to it.

Mr. HARVEY. When you say "lock up," you mean prevent hunting? Is that what you mean?

Mr. JOHNSON. Yes.

Mr. HARVEY. OK.

Mr. JOHNSON. The wild and scenic rivers, for instance, would close the riverbeds off to the use of any mechanized machinery and as you all know, the only sensible way to get into the Wrangell Mountains is by air. The riverbeds is the main source of places to land with a supercub, on a gravel bar alongside the rivers. The area is absolutely closed to any kind of hunting at any scale of hunting, if it becomes a park, a wilderness or a wild river, because of the inaccessibility of the use of mechanized machinery.

Mr. HARVEY. Well, that would be true if it would be inaccessible. Most of the proposals I've seen leave it accessible to aircraft, motorboats, et cetera, being established uses there. And I understand your point, but I——

Mr. JOHNSON. Well, the point being on the wild river——

Mr. HARVEY. But the legislation——

Mr. JOHNSON [continuing]. You cannot land alongside the river.

Mr. HARVEY. Unless the legislation said that you could.

Mr. JOHNSON. Well——

Mr. HARVEY. In other words, it's conceivable that Congress could write some rules here and most of the proposals do, indeed, have those special rules in them, to the extent they're needed.

Mr. JOHNSON. OK. My point is that if it is a park or a wilderness, you must backpack, you must walk in all of these areas, where the horse travel, about 50 percent of the Wrangells is accessible by horses. The other part is niggerheads and muskeg that cannot be traversed by horse, it must be backpacked. To backpack into where the rams are is totally inaccessible. The sheep that this gentleman is talking about, because of my 16 years of experience and livelihood out of the Wrangell Mountains, I know exactly the sheep he's looked at, because I've looked at them for 16 years and they're all ewes and lambs and there isn't any hunter that's interested in shooting any ewes and lambs. The lambs are smarter than were are and they utilize the glaciers and rock peaks, of which we would have to get to. The total number of guides is 56 in the Wrangell Mountains. There's 10 air taxis.

Mr. HARVEY. Am I correct in assuming that the ewes and the rams get together at some point in this process?

Mr. JOHNSON. Yes, sir, during December.

Mr. HARVEY. OK.

Mr. JOHNSON. The hunting season is always open in August and September. The total number of guides in there, as he was stating, make 50 percent of their livelihood in the Wrangell Mountains and this would be totally useless to them, because if they were out of business in the Wrangell Mountains, the other half of their business would not support their families, therefore, they'd have to look for another employment, and when one-half of the employment goes away, why, the other one-half is useless to them, because they can't participate only one-half the time in eating. To allow people to walk through the parks that are proposed would be totally useless. I have walked in most of the areas that we've discussed here today and the physical capabilities would be about 1 in 1,000 to walk through the parks in the Chitistone and Skolai Pass area. It's just absolutely physical stamina of a man to go through there. You have to be in topnotch shape and I have witnessed all of this for many years. Thank you.

Mr. HARVEY. Would you care to comment. I realize this would be putting you on a limit, as such, but I would assume, obviously, and you've stated that, that you would prefer that all these areas be left open for hunting.

Mr. JOHNSON. To a multiple use, yes.

Mr. HARVEY. Yes. I'm assuming that some of the area might be closed. Is there any way that you can advise us on ranking those areas, which areas are more valuable for the hunting and the commercial operators than others, for example?

Mr. JOHNSON. Well, through the Nabesna Glacier and its boundaries, the Shushana area, the White River area, the Chitna Glacier, Chitna Valley on both sides have been divided up into all of the areas tha Mr. Ellis mentioned, into exclusive guide areas. Each guide is responsible for taking care of that area that he has been allocated and the areas boundary inside the ground area, the white area being the ice area, there's no habitat within that area. And rugged peaks are not accessible by the guides or the hunters. I'm concluding that should be made——

Mr. HARVEY. In the areas in where there are animals, but——

Mr. JOHNSON. That's true. The living is actually made on the side hills of all those mountains. Down in the valley, itself, there's no animals to speak of and it's between 20 and 25 miles walk from the—what, that 50-mile road over from Chitna to McCarthy, that's the only access of this—it hasn't been for the last 2 years. The river bridges are washed out, but——

Mr. HARVEY. Yes. Go ahead.

Mr. DAPKUS. Dave Dapkus, Heritage Conservation and Recreation Service. One point of clarification in speaking on the wild rivers; a wild river, per se, will not stop traditional access. You'll be able to fly in, you'll be able to run your motorboat up and down for whatever purpose you want to do it. Thank you.

Mr. HARVEY. Steve?

Mr. SILVER. Is there a level—elevation level above which goat and sheep are taken in the Wrangells?

Mr. Johnson. Absolutely.

Mr. Silver. What is that level?

Mr. Johnson. All sheep are taken between 5,000 and 7,000 feet. The accessibility of these rivers, I might add, 1 to 5 years ago, I flew a man to McCarthy to float down in a kayak from McCarthy, down the McCarthy, down the Nizina, over to the Chitina, down the Copper and down the Cordova, and the man turned it down and was an experienced kayaker. He would not float it down and I had to bring him back out.

Mr. Silver. Do you—are you in agreement with what Mr. Gordon said about the prime sheep habitat, those three areas?

Mr. Johnson. No sir, I am not.

Mr. Silver. Would you clear that up, for the record?

Mr. Johnson. The prominent peaks produce the prominent trophy sheep. The largest trophy sheep that are taken in the Wrangell Mountains are on the Chitna Glacier, next to the Kiwani area. This is one area that he's absolutely correct in. The sheep that are over on the White River are very small. There's not a real large animal in the bunch. The Mount Wrangell, Mount Blackburn, Mount Regal, Sanford, and Drum all produce very, very good sheep hunting and very good next to the Chitna Glacier country, and this is all taken between the 5,000- and 7,000-foot level on those mountains. Probably Sanford and Blackburn would be as fine of areas as there is in the Wrangell Mountains. Thank you.

Mr. Shane. Can I ask a clarifying question?

Mr. Harvey. Sure.

Mr. Shane. Is the reason that the trophy heads are larger up against the very high peaks that the hunting pressure is lower than at the relatively lower levels?

Mr. Johnson. Absolutely not, no, sir. The breeding stock in that area produces larger rams and you can survey every ram in one area and come up with a certain size, and you can survey all the rams, every single ram in another area and come up with another size, and through the 16 years that I've been there, I've pretty well seen them all. On land and in the air.

Mr. Fankhauser. Bob Fankhauser, Alaska Miner's Association. I'd just like to point out that this tremendous area that we're talking about here is one of the few areas we've gone through in the last few days that is accessible by road and has an established transportation system through it, and I think it's very interesting that this has been in existence for some time and that these animals, fish and ducks and bigger game are still there and have thrived under a mulitple use system, and I think the committee should keep this in mind because when we talk about scenic resources and we talk about nonrenewable resources, I don't think it has to be either one way or the other. I don't think a couple of trucks going down the road carrying copper ore would make much difference in the total system. In fact, if we draw a line around it and establish it as a park, we're going to probably have a few hundred thousand visitors trucking up and down this road, so it will have more use than it does now. Thank you.

Mr. Harvey. Any other comments on the wildlife in the area?

Mr. EIDE. Yes. My name is Sterling Eide. I'm the Arctic game biologist at Glennallen for the Alaska Department of Fish and Game. I wanted frantically to talk last, and everybody has already said most of the things, so I guess what I'll do is perhaps direct a couple of statements and talk about things that apparently have not been said yet. First, in relationship to the sheep particularly, we counted 10,000 sheep in the Wrangells in our last count, which was the 1973 count. Slightly less, 9,000-something. Of those, the densest populations occur on the north side, primarily, in the Jacksina/Chisana/Nabesna/Peters Creek/Wiki Peak/White River areas. The area is extremely famous for its sheep hunting and the reason that it is is because it has produced the number one record trophy sheep for profit record, and also I think there's No. 2 and I think No. 3. These came out of the Chugach Range or the head of the Chitna Valley. From the importance of big sheep to the national and stateside hunter, the Chitna Valley is very important and the upper end is particularly. A figure of 350 sheep average per year out of the Wrangells is perhaps more correct than the 400 to 450 that you mentioned, Dave. The total harvest for the State, however, is between 1,000 and 1,100 per year, whch means that the significance stays over 30 percent of the total harvest coming out of these areas. That may seem like a minority, but when you think of all the rest of the areas that are going, too, why, it becomes quite important.

Another thing I would like to mention is that we have several settlements around the edge of the Copper River and these people who live there traditionally obtain—by traditionally, I'm not talking necessarily over 10,000 years, but now obtain a fair portion of their food supply and their recreation from areas that are proposed to be within this withdrawal. Even though some of those areas are not the richest in wildlife, they are the only ones that are available to the guide who lives right there. I'm particularly thinking of areas across from the village of Mentasta, across from the village of Gakona, Chistochina, Slana, Glennallen, and Copper Center. The lowlands are used for trapping, for shooting small game. By the way, trapping, some of them are commercial trappers, and there are some of those drainages that have become extremely popular with the local people. For instance, all of the area next to Glennallen, between the Chetaslina and the Nodina and the Sanford have strips that the people have been using lately and they cannot economically go out and obtain moose by flying to some other area, instead of these areas, because these are within a few minutes of town. They can fly over there with an aircraft, or in some cases, cross with a ferryboat or a riverboat and they'll be extremely unhappy if they're not allowed to do that.

The Copper River bison herd and the Nodina or the Chetaslina, ranges all the way up to the glaciers, and that herd is really important and really popular for local people to hunt. Also the Chitna herd has recently become quite popular. We've only had two hunts on it. By the way, that Chitna herd was—somebody said it was from the Shushana, it's in the Chitna, and it usually lives above the Tanana River, usually on the gravel bars or a little to the south, but it's been seen as far off as Logan Glacier. That herd, I don't think is one that people would like to protect hunting, since it's an exotic, transplanted situation.

I think those are the most important things that I wanted to cover, other than the caribou. The caribou herd in the Mentasta Mountians, or the Mentasta caribou herd, is the most stable herd of any interior caribou herd in Alaska. It is, for instance, far more stable then the Nelchina or the McKinley or the Forty-Mile caribou herd. It has not gone downhill hardly at all, and as a matter of fact, the estimate of 2,500 that Dave mentioned is a little low. It's probably more like 2,700 or something like that, and we have it on permits and it's really important to the local people. They would far rather hunt right across the river, near their back door than to have to go somewheres a long ways away. That herd is rarely accessible by road. When it is, it may be accessible only on the Nabesna Road. Generally, it is hunted in the Nodina, the Dry Lake area, the Ozzie Creek area, and the Sanford area. Something that also was not mentioned is that each fall, about 5,000 or sometimes more of the Nelchina herd will sweep into the Mentasta Range and inundate that herd and at that time, nobody knows one from the other. Then in spring, why, the Nelchina herd comes back and the Mentasta herd goes over into Sanford Pass. It's pretty important to us that we be able to hunt near those roads and partly because that's where the people can get to them without flying in. I'd like to mention that both the roads, both the Chitna Road and the McCarthy Road and the Nabesna Road, are important hunting areas. They are not high-quality, high kill areas, but they are important because of the access to the public.

Mr. HARVEY. Point of information. It would help us a little bit if you could identify these areas on the map or maybe just tell us. I believe that a lot of these areas of the (d)(2) proposals that are around, would permit hunting in the kind of areas that you're referring to.

Mr. EIDE. Yes; however, there are some real problems with existing administration lines in regards to these strips that are right across from Glennallen. It almost appears that somebody said, gee, here's the strips, let's keep them out. I'm not sure of that, it just looks that way.

Mr. HARVEY. And this is even in an area where the—under the administration proposal, there would be no—no aircraft could be landed?

Mr. EIDE. No; this is the area that is called park, where there would be no hunting.

Mr. HARVEY. Oh, all right.

Mr. EIDE. That includes a lot of our strips.

Mr. HARVEY. Yes.

Mr. EIDE. Most of them.

Mr. HARVEY. All right. Yes?

Mr. SHANE. Yes; another point of clarification. There have been some discussions of adjusted park boundaries because of the hunting of the bison in the Upper Chitna, and I think it—for the record, what is the sustainable annual harvest in that area? Is the take very good?

Mr. EIDE. For the record, our plans are to stabilize that population at 30 wintering animals. We now have about 49 wintering animals. This is based on a rather rough range analysis by one of the biologists with BLM and one of the biologists with Fish and Game.

Mr. SHANE. So the harvest would be what?

Mr. EIDE. Well, right now, they're coming out with about 25 or 30 calves a year, so you'd probably be able to take 6 or 7 annually, hunting 8 animals.

Mr. SHANE. Six to seven animals?

Mr. GORDON. Point of clarification? What was the six to eight, was this on the—you're not taking that many now out of the Upper Chitna area?

Mr. EIDE. Oh, yes.

Mr. GORDON. Are you?

Mr. EIDE. We have been, yes.

Mr. GORDON. What's the annual take from the Nodina area?

Mr. EIDE. Sixteen is our harvest goal. The season the last 2 years has been fairly short and they've put in some walk-in only or access restrictions and we've only gotten nine in the past 2 years.

Mr. GORDON. A couple of other questions on sheep, I was asked to ask you if you know, offhand. If I'm reading this correctly, when were the first, second, and third largest rams taken? Did you mean in the Wrangells?

Mr. EIDE. Um-humm.

Mr. GORDON. OK.

Mr. EIDE. In the early sixties.

Mr. GORDON. And then the other question was: In the past 2 or 3 years, where have the largest rams in the State actually been taken?

Mr. EIDE. The Chugach Range. I really don't know the scores of all of the most recent rams. There may be some in the Fairbanks region that were big this year, I don't know.

Mr. GORDON. By the way, as a point of clarification, I—from what I've understood these gentlemen all saying, I don't see that there's any conflict between the information I gave you and from what they've said. I just simply tried to highlight the particular key areas, in no way questioning all the other things they said as being true or false.

Mr. CONTOR. Roger Contor, of the National Parks Service. I think Rich Gordon attributed some goals to the National Parks Service, which I'd like to correct, so there isn't any doubt. It is not necessarily a goal of the National Parks Service to provide easy hunting, or is it a goal to make sure that the largest sheep are huntable. I would say that the administration is very much dedicated to the position of trying to reach a fair compromise with the hunting groups, to have some whole herds, some whole populations and whole ranges available to the hunters and that, conversely, we'd like to see some whole herds of animals protected for the nonconsumptive values which have been mentioned. I think we should admit at this point that we have some new and better information in the sheep populations and I'll ask Jerry Wright in a minute to confirm.

My general impression is that we agree with Mr. Eide's concept of where the sheep are and so forth, more closely than perhaps any of the others, but we have been working with the State and we've been assessing the recent boundaries which the House subcommittee has placed, and we're talking again about where the preserve and the park boundaries go, and that's where the hunting goes and where the hunting is found. The latest look at the House subcommittee markup down there would put about 60 percent of the sheep in the preserve and available to the sport hunter. Again, the boundary is not exactly the best when you're working on it with a number of people and we hope to meet, I think, objectives that would be appreciated by the State and by the hunters and by the people who are nonconsumptive users of the sheep. I think we should make it clear that the bill provides for aircraft landing at designated sites. I think all of this is in wilderness, in parks, in reserves, and on the rivers. That doesn't mean you're going to be able to land everywhere, but you'll be able to land at reasonable points where you—basically, where people have been landing.

I'd like to ask Jerry Wright if he has any figures to correct or supplement from what we've heard?

Mr. WRIGHT. Let me just supplement the 60 percent, which might be misleading. But using the figure that Sterling has, of 30 percent for the entire region, we've calculated under this subcommittee markup, about 10 percent of the entire State harvest would fall within the park, 20 percent within the preserve area.

Mr. SILVER. What was that calculation based on?

Mr. WRIGHT. They're based—the A.D.F. & G. harvest ticket data for the last 4 years.

Mr. SILVER. Plus actually where the sheep were taken over the past years?

Mr. WRIGHT The areas can be determined from that data. These analyses were done by the University of Alaska for the National Park Service. We will all admit that there is not a great—we would like better specificity in the data as to the locations.

Mr. HARVEY. Yes?

Mr. JOHNSON. We already have three fine areas to observe sheep from, with a road right beside them, in McKinley Park and in the reserves of Sheep Mountain and down on the Kenai at Copper Pass. The three areas are observable sheep year round and the area that you're talking about locking up for sheep is not accessible, except by air and then you can hardly see the sheep from any place you can land, and the point is, when you lock up 30 percent of the sheep or 40 percent, you kick 30 or 40 people—percent of the guides in the areas out of business.

Mr. HARVEY. Yes, Jack?

Mr. HESSION. Jack Hession, Alaska Coalition. Just to follow up a statement by Mr. Eide, if the largest rams were taken in the early sixties, does this suggest that over the year since, the trend in the ram size and horn size has been declining? What are the impressions?

Mr. EIDE. I would have to say that for one reason or another, yes, there has been some decline in horn size, absolutely. I have a—by the way, Sterling Eide again, Alaska Fish and Game. I have some figures that were mentioned by Jerry, about 10 percent of the harvest would come out of the area that had been marked—marked by the subcommittee?

Mr. WRIGHT. Yes.

Mr. EIDE. You're working with harvest data which is thirdhand or something. Now, our actual sheep counts would indicate that we have more like 40 percent of the sheep in the area, where you have 10 percent.

Mr. CONNOR. I thought he was saying statewide.

Mr. WRIGHT. Yes, I'm sorry.

Mr. HARVEY. He was using your 30 percent number of the statewide harvest——

Mr. WRIGHT. Yes.

Mr. HARVEY [continuing]. In the Wrangells, today.

Mr. WRIGHT. That's what I was talking about.

Mr. HARVEY. And one-third of that harvest would be within the park area, or would be in the no hunting area. Yes?

Mr. SOMERVILLE. Yes. My name is Ron Somerville, also with the Department of Fish and Game. One comment I think would be worth—relatives to this thing of trophy size. Some of the areas, due to pressures, I think you must recognize that sheep hunters traditionally move throughout trying to find a more bigger sheep, a lot of them. Of course, some that are hunting for the first time will hunt traditional hunting areas without worrying much about size. But one thing you should remember, a lot of the trophies rating is based upon Boone and Crockett, and sooner or later, you're going to put the top 150 or whatever it is, bear, moose, caribou, and sheep in the Boone and Crockett, and just because not one is entered after that doesn't mean that large sheep are not being produced. This year, we have had an increase in some of the areas on horn sizes and we will submit that for the committee's consideration.

Mr. HARVEY. Any more comments? Go ahead.

Mr. SILVER. I have a couple of questions for fish and game. With regards to the people in the Glenallen area whom you mentioned, what's the mix of people taking out their sport hunting license under State subsistence permits, or is it all one way or the other?

Mr. EIDE. My reply is, we have no such thing as a State subsistence permit for game. We just don't.

Mr. SILVER. So it all would be under sports subsistence—under sport hunting licenses?

Mr. EIDE. Right. By the way, that's all reported takes that I'm talking about mostly, and the illegal take, which I guess is what you might call the subsistence take. It is not reported and the hunters are not required to report.

Mr. HARVEY. Do you have any estimate of that?

Mr. EIDE. Not anything I'd want to hang a number on. No. We see—like, last year, we had eight illegal kills that we know of, moose.

Mr. SILVER. And when is the season for sheep hunting in Alaska?

Mr. EIDE. August 10 through September 20.

Mr. SILVER. And one last question. Exactly where are the bison that are hunted located in regards to the park boundaries?

Mr. EIDE. In the Copper River, they are sometimes killed right on the bluffs, but only an occasional one is killed on the bluffs, by the mouth of the Nodina River. The rest are taken either by people who fly in to Nodina Lake and then hike out or by those who land on the three or four strips in the Nodina River and the one or two on the Chetaslina. If we have a late season, they will kill more of them on the bluffs. In the Chitna, they're almost all taken on the south side or on the bars near Bear Island and near the mouth of the Tanana River.

Mr. BEVINETTO. Is there a historic presence of bison in this area? They are exotic?

Mr. EIDE. They are exotic.

Mr. HARVEY. Yes?

Mr. WICKES. Thank you, Mr. Chairman. Jim Wickes, Department of Natural Resources. I'd like to just briefly throw out a couple of statistics relative to the area of statewide habitat values of the Wrangell Andrus proposal and also the Tetlin reserve to the north. The Tetlin proposal, under the Secretary's boundaries, comprise roughly 1 million acres, of which almost 50 percent fall in the top habitat grade level on a statewide basis.

Mr. HARVEY. Top 10 percent?

Mr. WICKES. Top 10 percent; right. The Wrangells unit is generally more moderate in its potential, no doubt because of all the nonproductive lands. However, there are 270,000 acres which rank in the second level and undoubtedly those fall in the more productive river valleys that have been discussed previously.

Mr. QUARLES. Is your computer capable of separating out between the Wrangell Park and the Wrangell perserve areas?

Mr. WICKES. Yes. In terms of those 270,000 acres of second level category, the preserve would have roughly two-thirds, 180,000; 90,000 being in the part under the Andrus proposal.

Mr. GRAHAM. Mr. Chairman?

Mr. HARVEY. Yes?

Mr. GRAHAM. A point of clarification to the State on their comparative ranking. It's my understanding that this ranking is a composite of game values, sport fish values, commercial fish values and development capabilities, unless you've changed it, and some of the early printouts that I saw would take a Dall sheep area, for example, if there were no commercial fish and no sport fish and no possibility for improvement in that area, a Dall sheep area would rate very low, is that correct?

Mr. WICKES. Right. With the figures I'm quoting where I referred to the uplands wildlife habitat, no fishery is included, but it is based and does emphasize biological productivity, irrespective of the species type. So areas where there is intensive production——

Mr. HARVEY. We understood that from the discussion of a couple of days ago.

Mr. WICKES. That's why the Tetlin area, because of its high biological productivity, is so high on the rating.

Mr. HARVEY. Yes, sir?

Mr. BISHOP. Dick Bishop with the Department of Fish and Game. I'd like to comment just briefly on uses in the Tetlin area, that general northern portion there, and to the extent that they are both subsistence types as well as recreational types use of wildlife in that area, thinking strictly of consumptives uses right now. The major species there, which may have been mentioned, I was out of the room partly, but moose, caribou to some extent, sheep, bears, both black and grizzly. It's very good fur bearer area, well known for producing large numbers of muskrat. It's an important waterfowl area and the use of waterfowl are both by local people as well as people from other communities that go there to hunt waterfowl. And the other comment I would like to make is that, with regard to sheep in the Wrangells and the potential for growth and so on, that the technical consideration that may be of interest to you, that a fair amount of study has gone into comparing the vigor of sheep populations throughout the State and it's been found that horn growth reflects the general vigor of sheep quite well.

In fact, it's pretty clear that there are substantial differences from one population or one portion of the mountain range and one portion of the State to another, and as it all turns out, the Wrangells, for various reasons that are still not clearly understood, consistently produces the most vigorous, largest sheep in terms of body size and conditions and horn growth of any place in the State, and other populations fall in somewhere below them. So that that particular area, from whatever your point of interest may be, is significant as far as the kind of sheep that it produces.

Mr. LEEDY. Bob Leedy, Fish and Wildlife Service. Two brief points on subsistence. By our figures, local subsistence harvest of 77,000 pounds of whitefish occurred in 1974, whitefish with some grayling and pike.

Mr. HARVEY. This is in the Tetlin area?

Mr. LEEDY. In the Tetlin area, excuse me, yes. And depending on cyclic variations, such lowly species as the snowshoe hare take on extremely important value. Again, we have recorded that 2,200 hares were taken in 1974; they use what they can find.

Mr. HARVEY. Thank you. Yes?

Mr. WRIGHT. Jerry Wright, NPS. Just to focus quickly on some of the diversity of the wildlife, Icy Bay, down along the coast, has probably one of the highest densities of harbor seals that we've found anywhere in that area of the Coast. There's a significant sea lion colony at a place called Sit Kagy Bluffs along the Malaspina Coast, and although we could—I'm sure, could argue on the status, there is a species of black bear, colored face, blue/gray colored face, known locally as the glacier bear, which utilizes as habitat much of the Malaspina forelands.

Mr. GORDON. Perhaps a correction should be made to what I wrote in the environmental impact statement in which this area is discussed. At the time we did that work, we thought the Fish and Game, State book on wildlife habitat so indicated that the black bear, and therefore it's colored form, the glacier bear, were distributed all along that coast. Now, people in Yakutat have told me, and I can't really verify this, though I haven't seen any evidence on the ground to the contrary because of the glaciated Yakutat Bay on the south and Icy Bay on the west, that apparently black bears have not gotten into this Malaspina Coast and therefore, they may be very few or none of the black bear or glacier bear within the park proposal. In any event, the important—by far, the important area for the glacier bear is the Yakutat area.

Mr. HARVEY. Thank you. Any more comments on wildlife? All right. I think this provides a logical spot for a break for lunch. We'll be back at 2 o'clock.

AFTERNOON SESSION

Mr. HARVEY. The workshop will come to order. We're on now to the renewable resource category in the Wrangells area. Again, we're going to take up the Copper River Delta until we finish this, so let's stick to that part of the Wrangells area that is not in the Copper River Delta. Who would like to lead off on renewable resources?

Renewable Resources

Mr. GALEA. Yes. I'll be speaking primarily of the past Morton proposal, the Wrangells National Forest and the—My name is John Galea, Forest Service. The forest proposal had roughly 1.3 million acres of forested land, of which a relatively small amount, 170,000 acres was classified as commercial forest. These commercial forests probably would be comparable with those stands found in northern Minnesota, southern Ontario and in the International Falls area. The standing commercial volume bas been measured at roughly 680 million board feet of annual potential yield of 12 million board feet. We want to consider the area that is included within the Copper River, Wrangells area guide, which you have a copy on record. If you look in that roughly 829,000 acres of forested lands that have been identified with commercial potential, with a standing commercial volume of 3-million board feet and an annual potential yield of roughly 80-million board feet. Now, the present use of the timber is primarily for local use. There is some green lumber produced, but really an insignificant amount, mainly for firewood and house logs.

Mr. HARVEY. OK. Any more comments on timber, agricultural potential?

Mr. EPPS. Alan Epps with the Cooperative Extension. The agricultural potential in the area isn't a significant thing to look at, except from one standpoint, and as was mentioned several times this morning, the use of horses for access into any of these areas, depending on which category they happen to fall into. It's one of the few places in the State that we can utilize horses. There are considerable acres in the area that could be utilized as forage production and for grazing purposes for these types of livestock and pack animals. This might be a consideration for this use. The major areas that would potentially be a conflict would be on the west—yes, west bank of the Copper River, just as you come up around the bend. There's quite a stretch of very good agricultural soil right along there, jsut across the river.

Mr. HARVEY. Any other comments on this category? All right. We'll move on to the non-Federal lands, State selections and Native selections situation. The State is once again tardy here, the Natural Resources Division, so do the Natives have any comments? Go ahead.

State and Native Land Selections

Mr. **Propst**. Yes. I'll comment just briefly that the Chugach Natives have selected some 17 townships of land along the Bremner drainage. Probably somebody from the Park Service could fill us in on exactly how far up the Bremner that goes. I don't know the mileage or what canyon it stops at, but the total selection there is some 393,000 acres. Also that extends out to the confluence with the Copper and then Native village selections extend up and down the Copper a little ways, to almost the Tiexel confluence and then up the Tazlina to Marshall Pass and slightly over that, down into Haydon Canyon.

Mr. **Harvey**. Do you have any comments about the proposed—what uses the Natives have in mind there, or anything in particular?

Mr. **Propst**. Well, probably the major uses there would be tied to a future or copper or highway. Much of the land would be developed as real estate, along with that.

Mr. **Harvey**. Any other comments? Yes, Jules?

Mr. **Tileston**. Jules Tileston, BLM. As with the Iliamna area, there are some substantial blocks of land, particularly in the south, which in several of the proposals are not included and should be considered. Otherwise, we're going to end up with a similar situation where the forelands are controlled by one agency and BLM has the icecaps off and that's just something that needs to be considered in terms of official management.

Mr. **Harvey**. Yes?

Mr. **Reffalt**. Bill Reffalt with the Fish and Wildlife Service. I have some of the State's data before me regarding the Tetlin, so I'll go ahead and put the statistics in. The Tetlin area is about three quarters of a million acres total size, approximately a quarter of a million acres have been selected by the Native village corporations in the area, within the proposal area, and the State has indicated an interest in about 100,000 acres in the Tetlin area. I think that one of their higher priorities is about 30,000 some acres immediately adjacent to the Canadian border as the Alcan Highway enters the State. It has a fairly high priority for the State.

Mr. **Shane**. I'd like to make two comments, one with regard to the Native selections on the Copper River and the Bremner, and the second with regard to the interest that the State has expressed in the lands in the Chitina Valley. The Bremner Valley is, we feel, critical to the Wrangell Park, primarily for its wilderness resources and we are very interested in helping in any way that we can in facilitating a land trade that would be satisfactory to both Chugach and to the Federal Government. Lands along the Copper River are also, of course, important for scenic purposes, and we would be interested in helping that way and with a land trade in that area also.

The State hasn't discussed its proposed selections in the Chitina Valley and on the west forelands of the Wrangell Mountains, but I'd like to make a few remarks. The State already owns a number of townships around McCarthy. I believe it's around 70,000 acres and seeks, as a high priority section, lands between that area and Chitina, in other words, on the north side of the Chitina River. Lowlands area, land along the route of the old Copper River Railroad. Now, the reason we are concerned about those selections is that this area will be the key access route to the Wrangells Park. In fact, in the future, if you'll look at a map of Alaska, it seems logical that the two most heavily developed and heavily used areas, in conjunction with the existing and new national parks, would be probably the south side of Denali and the Chitina Valley area of Wrangell, so we're talking about areas that are comparable in importance to, for example, the entrance to Yosemite Park or the Smokies Park or Yellowstone.

We feel it's very critical that we don't have the same situation developing in Wrangell that we've had develop in existing parks in other States. The State has said that it intends that the—one of the prime purposes of its selections in the Chitina Valley would be the development for vacation homes, second home subdivision type of activities. As the threshold to the Great Wrangells Wilderness or Wrangell Mountains National Park, development of the entire lower Chitina Valley would be—could just too easily become 60 miles of new strip development right along where most people will be experiencing the area. Now, by making this complaint and by hoping that the areas of additional selections do not pass to the State doesn't mean that we're in favor of making the whole Chitina Valley a wilderness, by no means. The fact of the matter is that the State already has selections around McCarthy far beyond what would be needed for private lands in the valley, and there's already, I believe, approximately 5,000 acres of subdivided land, primarily of interest for second home development. Also of interest for permanent residences is the McCarthy area. So there is already more than an abundance of land available for recreational and private use, and additional lands passing from Federal hands would be appropriate. I might also point out that Atna Native Corporation will also have quite considerable holdings in the area, so that that, plus the existing State and private lands, is more than sufficient.

Mr. HARVEY. Thank you. Any further comments?

Mr. WRIGHT. Jerry Wright, NPS. I can provide some figures for the record, also based on the State land study for the Wrangell complex included in the Andrews proposal. There are about 11 million acres of existing Federal land. Present Native selections total 1,502,000 acres. This would be both Chugach and Atna. They estimate final Native selections to be 1,364,000 acres, State patented selections are nine—almost 1,900,000.

Mr. HARVEY. Thank you. Yes, Jack?

Mr. HESSION. Jack Hession, Alaska Coalition. The State has also identified numerous townships in the upper Chitina River Valley, which are in somewhat of an ambiguous state. I wish the State was present to comment on that, but those particular townships were under litigation until very recently. I think within the last several months, the case was dismissed without prejudice, but as in the Yukon Charley and as in the Gates of the Arctic, these townships are identified for State selections. Also I should add to Mr. Shane's comments that the State has also identified key foreland areas around the eastern side of the Copper, inside Native village withdrawals. This would be the checkerboarding effect on the forelands, the scenic vistas to the Wrangells. And I might also add that there's feature of the State's identifications in the Wrangells that's common to their other similar identifications in over 20 other (d)(2) areas, and that is, while small, relative to the overall size of the area, they're critically located and strategically located. In the case of the Wrangells, the State selections would, in effect, disembowel the park proposal. So in evaluating these, I think you should look to the location and not to the size of the proposed State selection.

Mr. HARVEY. Thank you, Jack. Any other comments on that? All right. We'll move on to the energy potentials in the area and the minerals potential, other potentials. Does anyone want to address that?

Energy Resources

Mr. MCKEEVER. Yes, John McKeever, Much of the area that I would like to talk about is not within the Wrangell Mountains as such, but it is—impinges upon withdrawals which have been suggested, bordering the Wrangell Mountains, primarily on the east side of the—I beg your pardon, on the west side of the Wrangells, across the Copper and near the Copper River and near the communities of Copper Center, Glennallen, Gulkana and Gakona.

Mr. HARVEY. Fine. The Copper River Basin, itself, is a geological, topographic, and sedimentary basin of about 4 million acres, which is believed to have a very favorable petroleum potential. It has been little explored, compared to some frontier areas, but it has been more heavily explored than other frontier areas and as a result of the 10 wells which have been drilled in the area, 4 of them or 40 percent have indicated shows of oil or gas or both. Additionally, there are substantial areas of oil staining on outcrops on the west and on the southeast. There are mud volcanoes in the Tazlina areas, which issue methane gas. There are mud volcanoes on the—in the flanks of Mount Drum, the lower flanks of Mount Drum, which produce some carbon dioxide and associated gases of methane and of other hydrocarbons.

The rocks in the outcrop, that is to say, the rocks around the rim of the basin, show ample evidence—show substantial amounts of frost impermeability. Certainly—and this is confirmed by wells which have been drilled within the basin, some of the 10 that I speak of, indicating that reservoir rocks are present and I might add that the general geologic nature of the basin is such that there are more—a greater thickness of reservoir rocks on the east side of the basin than on the west side of the basin. We know that there are source rocks present and we know that there are traps in the area, that is, traps capable of containing oil or gas, which have been reviewed by geophysical methods, which are capable of containing substantial amounts of hydrocarbons. These would be economical for a number of reasons, one of which is that—or several of which are that in the Copper River Basin, you have ready access to an existing road system, you have ready access to an existing pipeline, you have ready access to supply centers which will—and population centers, which will minimize your problems of personnel and equipment.

Consequently, in the Copper River Basin, it is possible to explore for smaller targets than, say, in other areas. Oil and gas reserves of the area vary widely, as might be expected, but the U.S. Geological Survey has estimated that there are 160 million—a possible 160 million barrels of oil and 800 cubic feet of gas in the area, while the State of Alaska has upped it. They say that there are perhaps as much as 200 million barrels of oil and 1.2 trillion cubic feet of gas. Now, these are resources, of course, that the Nation could use. I have nothing else to say about oil and gas. As far as coal goes, there may be some representatives of the coal industry here who may be prepared to talk. As far as geothermal energy goes, the heart of the area, the Wrangell volcanic field appears to be of substantial importance as a geothermal area, and all of the area has been—all of the basin area has been—is recognized as having a substantial potential for uranium. Does anyone have a question?

Mr. HARVEY. Are we ready for coal or more questions? Sure, go ahead.

Mr. BANNISTER. I'd like to discuss coal briefly. There are coal intercepts in the holes drilled for oil and gas in the area, but the coalbeds are relatively deep and relatively remote. On the extreme southern boundary of the proposed Wrangells area, there are some unusual coal beds, high rank coals that have been much discussed over the years. The Bureau of Mines retained a consulting engineer who had done considerable work on those for private companies. He has prepared a map, which we will turn over to you when he gets through speaking. He has some thoughts on the coal potential in the area both inside and just outside of the (d)(2) lands. This is Mr. Renshaw.

Mr. RENSHAW. Thank you, Mr. Bannister. I'm A. L. Renshaw, a private consulting engineer, lifelong resident of Alaska, third generation. I'd like the record to state that I have no vested interests in any mineral properties in the area that I'm going to discuss. The northerly gulf coast, the area shown here extending essentially from the Copper River Delta to Yakutat Bay. This is a tertiary geologic province, bordered by older rocks to the north, to the east and to the west, and progressively exposing younger sediments as you approach the forelands area to the south. The area is characterized geologically by a series of long, linear faultings, which are thrusting the older sediments over the top or exposing them at elevations higher than the younger sediments. So we have a band type arrangement of progressively younger sediments. The faulting has also produced local exceedingly complex geological associations. Within the tertiary province, the lower sequence of the tertiary rocks have been identified as a sequence that's called the Kushtaka coalbed series, and I'm just going to refer to it as the Kushtaka Formation. This is exposed and most notably described in the literature on the vicinity of Bering River. Immediately west of the Bering Glacier area is the Bering River coalfield, which has been known since before the turn of the century. It's an extensive area of complex outcroppings of high-rank bituminous and anthracite coals. These have been explored in very considerable detail near Stellar and Bering Glaciers. They're covered to the north by the Martin River Glacier. This was the scene of a great deal of activity early in the century. Several railroads were constructed and the remnants remain on the ground. One of the attempts to construct a railroad to the Kennecott mine began at Katalla bay, just at the entrance to this area. Another railway did, in fact, exist into the anthracite or easterly portions of this coalfield. This private activity was brought to a halt in 1906 when coal mine claims were done away with and the leasing system was instituted. There has never been any commercial production from the Bering River coalfields, either because of Government intervention of one type or another, or because the coal market was such that it did not encourage production. The Bering River Coal Field is one of the few known deposits of high ranked coal near tidewater on the entire Pacific rim and it has never produced.

To the east of the Bering River or Bering Glacier, are the Robinson Mountains. The same sequence of lower tertiary rocks is exposed in this area, and again, there are coal occurrences. Very little mapping has been done, the prime reason being that in this portion of the gulf coast, there are no adequate natural ports. These sequences continue and are found sporadically through outcroppings that penetrate the ice cover. They have been mapped as being persistent and continuous to the head of Icy Bay, where there are numerous occurrences of the high ranked bituminous coals. Again, in the Samovar Hills, these sequences are exposed and some mapping work has been done. The most easterly occurrence is on the western side of Yakutat Bay, where minor occurrences are found in a small area of the tertiary sediments. There are no estimates of the number of coal seams in either the Bering River area or this larger Robinson Mountain, Yakutat or Malaspina continuation. There is about 120 miles of formational exposure. The zone of outcrop where coal occurrences are known varies in width from about 5 to 15 miles. My personal involvement has been primarily in commercial exploration in the Bering River coalfields. It's my opinion that the area, if properly explored and developed, would support three to five mines, with a capacity for production in the range of 1 million to 5 million tons per year.

Mr. HARVEY. Total?

Mr. RENSHAW. Total.

Mr. HARVEY. Not per mine?

Mr. RENSHAW. No. Each. Each 1 to 5 million tons per year each.

Mr. HARVEY. Each, OK.

Mr. RENSHAW. Considering the continuation of the same type of occurrence, even though access would be difficult, I believe this entire area has the potential of sustaining a production of something on the order of 20 to 30 million tons a year for probably a period of 50 years. It is a very, very significant occurrence of coal on a comparative worldwide scale.

Mr. LEEDY. Excuse me. Underground or strip mining?

Mr. RENSHAW. It would be a combination. These coal measures are exceedingly complex. They are folded, they are faulted. There are places where the folding and faulting can be of an advantage for surface mining. In other places, the only way it could be mined would be by underground methods. No one knows, to this day, how many coal seams are here. There are estimates of anywhere from 10 to 100. I'm certain the 100 is excessive, because of repetitions in folding and faulting. In the Bering River field, it's quite evident there are somewhere between 20 and 30 seams, although estimates range as high as 60. The thicknesses range from 3 feet to 40 feet. The 40 foot thicknesses likely are due to magnification at the points of fold. A more realistic figure of general average thickness may be on the order of 15 feet. These are very high quality seams, very little in the way of partings or intermixed shaley portions. They are a pulverant, having been subjected to substantial geologic stress. Another aspect of this area, bearing on the energy question, is that in the younger sediments that border the forelands area are a series of oil and gas outcrops, natural outcrops. These are pools that bubble with methane, other gases. There are a number of documented oil flows that come to the surface. This occurrence in the Katalla area was the basis for a small production, a small refinery operated in the early 1900's, through about 1923. The drillings, although shallow, were on an anticlinal structure that had numerous surface emanations of oil and gas. A series of oil and gas seeps are found along what is known as the Sullivan Anticline. These seeps extend into the Samovar Hills near Icy Bay. The Samovar Lakes have a natural sheen of oil.

Other outcroppings are known on portions of the Bering River and in the central Robinson Mountains. There are numerous reports of explorers in this area smelling oil. It is my conclusion that the oil is probably derived from what has been described as a late tertiary organic shale member. This is actually a series of high organic shales and sandstones, which contain a very large proportion of hydrocarbon substances. No work has been done on it. It is a zone that should be investigated for oil shale possibilities. It ranges in thickness from 180 to over 400 feet and it persists from Kayak Island, at least as far as the Samovar Hills. Thank you very much.

Mr. HARVEY. Thank you.

Mr. LEEDY. Bob Leedy, Fish and Wildlife Service. I'd just like to ask for a rough estimate on the number of surface acres per year that might be opened up by five mines in the Bering River area? That's the production figures you mentioned.

Mr. RENSHAW. This is exceedingly difficult to answer, because of the complexity of the geology. This could, on a yearly basis, be anywhere from tens of acres to hundreds of acres.

Mr. LEEDY. You suggested 15-foot average depths of the seams?

Mr. RENSHAW. No, the thickness of the seams, not the depth.

Mr. LEEDY. Excuse me, I meant to say that.

Mr. RENSHAW. I cannot talk in terms of depth here, because the seams are undulant and do not correspond with the topography. Pitching, and dipping, they are folded and faulted.

Mr. LEEDY. Right.

Mr. RENSHAW. One of the deterrents to the development of this area has been the complexity of the coalfield and the expense of surveying it geologically. Another factor is that this is an area of extremely high precipitation. It rains continuously throughout the summer months.

Mr. HARVEY. Any other comments about the energy potential? Yes?

Mr. MILLER. Yes. Tom Miller, with the Geological Survey. I'd like to address the geothermal possibilities of the Wrangells, particularly Mount Drum. The Geological Survey has recognized several of the known Quarternary volcanoes in the Wrangell Mountains as having geothermal potential, however, most of the potential, we feel at the present time, at least in terms of our study and the area we were able to study, probably lies in Mount Drum, which is located at the extreme western end of the national part area, about 35 miles from Glenallen and the major transportation networks in Alaska. Mount Drum is a 12,000-foot high mountain. It has no surface manifestations of amount of heat flux.

In other words, there are no hot springs, no fumaroles, not like Mount Wrangell. There is a mud volcano on its flanks, which has a temperature of about 86° Fahrenheit, which is phenomenally warm, but other than that, there's no other known surface—anomalous surface heat manifestations. However, detailed geological mapping, geochemical studies, and geophysical studies suggest to us that Mount Wrangell has a stored heat content of somewhere around 200 to 300 times 10^{18} calories, which is a figure very hard to visualize in any sense, however, it would represent somewhere between—it would represent about 10 percent of the stored heat content of the resource of this type in Alaska and about 20 percent of the geothermal resource of this type in Alaska that is outside lands not already designated as (d)(2).

Another way to look at the potential resource, and I'm talking about stored heat in the ground, converting this to actual heat reservoir values that might be utilized in the generation of electricity, steam, or space heat, whatever, you perhaps might be able to utilize 5 to 10 percent of the stored heat, assuming there are suitable reservoirs, et cetera. This would result, if our calculations, figures and so on were correct, to a resource which is equal to the geyser area north of San Francisco, which supplies, I think, close to 50 percent of electricity for the city of San Francisco.

Mr. HARVEY. Excuse me. This is Mount Drum, now, or——

Mr. MILLER. Yes; Mount Drum.

Mr. HARVEY. OK. Thank you.

Mr. MILLER. Most of the other volcanic areas that have some potential, such as Sanford, Wrangell, the small cone over on the Eklutna Glacier near the Canadian border, have small amounts of potential, at least as far as we can see with limited study, plus the fact that the extensive ice and snow coverage prevents much more study. But Mount Drum, the model we have proposed for Mount Drum, is, indeed, that. It's a model. It's a model we are applying, both the Geological Survey and I think the Department of Energy, throughout the United States in evaluating geothermal resources. It has—drilling and other studies in the lower 48 have suggested that the model seems to be working out. To some extent, in talking about Mount Drum, it's a pig in a poke. As I say, we see no hot springs or anything else there, but the work we've done suggests that the volcano is young enough that the heat content should still be there and it's, as I say, a process we are using to evaluate similar heat sources throughout the United States. Thank you.

Mr. HARVEY. Thank you.

Mr. SHANE. Ben Shane, Alaska Coalition. I've been playing with some of the State's resource figures and by my calculations, the oil lands in the Wrangell Mountains proposal come to something around or a little less than 1 percent of the oil lands in the State of Alaska, and if you look at the U.S. Geological Survey's estimates of favorable high potential and proven reserves of petroleum in Alaska, which comes to 29.5 million acres, none of those acres are within the Wrangell Mountains. As far as coal is concerned, according to the State of Alaska computer printout, the Andrus proposal, which is roughly the boundaries of the other proposals now also, none of the areas contain any coal in any of the percentiles ranked by the State of Alaska. It would be very interesting, I'd like to know the percent of Alaska's coal that might be located in the Katalla area and I'm wondering whether either the State or the USGS could assist me with that question.

Mr. RENSHAW. The coal is contained in some proposals. The coal that this gentleman was speaking of, for example, is contained in some of them.

Mr. MCKEEVER. Yes. Those would probably be in S. 1500. They would be in no other proposals, except those proposals that relate to the Cooper River Delta Wildlife Refuge, which we'll be discussing later.

Mr. RENSHAW. Some of the recent Morton proposal does include a part of that coalfield.

Mr. HARVEY. Yes; about half of what——

Mr. BANNISTER. Perhaps the point is that some of the proposals, other than the Andrus proposal, did include part of Bering River coalfield.

Mr. TILESTON. Yes; about half of the known Bering river field and portions of the extensions here. I failed to mention, too, what I believe is important. This coal bearing series is known to continue under the younger forelands series and has been penetrated by numerous oil wells, both onshore and offshore. My understanding, and I can provide the details later, is that the Katalla coalfield is covered by preference right leases, which predate any actions by withdrawals, which means there's an outstanding valid right.

Mr. RENSHAW. I believe there is only one at the present time.

Mr. TILESTON. I'll provide the details later.

Mr. HARVEY. It would be interesting to find out whether there are actual leases or applications, which might or might not be valid; right?

Mr. TILESTON. Right.

Mr. MCKEEVER. John McKeever, Alaska Oil & Gas Association. In response to the observation that possibly the Wrangell Park does not impinge upon the Copper River basin, the map that I have shows five outlines of some kind of withdrawal into the Copper

River basin, so the numbers are subject to change by an order of magnitude clause.

Mr. HARVEY. Yes?

Mr. LEEDY. Bob Leedy, Fish and Wildlife Service. I would like to repeat Mr. Shane's question and I'm curious as to what percentage of State coal is found in the Katalla fields?

Mr. WICKES. I don't have that information now, but perhaps we could dig it up for you in the next day or two.

Mr. HARVEY. That—we can have an argument forever about that, I think.

Mr. LEEDY. Yes. Just looking at a map, what——

Mr. HARVEY. Most of Alaska's coal, I believe, is north of the Brooks Range.

Mr. LEEDY. Well, no, there is a tremendous amount of coal in——

Mr. HARVEY. Something that we might be interested in developing is going to be on tidewater, so I mean——

Mr. LEEDY. Well, yes; I was thinking of the Beluga fields up Susitna Valley, Matanuska, and so on, far greater fields with far better access.

Mr. HARVEY. I think we have a lot of information about the coal already from other sources.

Mr. HAWLEY. Can I comment?

Mr. HARVEY. Yes, sure.

Mr. HAWLEY. Chuck Hawley, Alaska Miner's. One point is that the coal is of bituminous and anthracite quality and some of it is coking coal. I think it's the only—there are only two other coking coals, a small amount in the Matanuska field and some on the North Slope, so it is—has that property.

Mr. RENSHAW. Yes; that's a point that perhaps should be clarified, these are metallurgical grade coals. Btu classification runs from about 12,000 to nearly 15,000 Btu's per pound, whereas the Beluga and the Healy River fields range in the 8,000 to 9,000 category.

Mr. PROPST. Carl Propst, Chugach Natives. Just to add to Mr. Renshaw's statement, I think that 12,000 to 15,000 Btu estimate is about the highest in the State, at least it's the highest that we've seen. And then one or two other comments. I don't think it's been mentioned, the uranium potential of the Robinson Mountains. Very recently, a lot of interest has been sparked in that. I believe ERDA has been in there through contracts or subcontracts for the last year or 2, perhaps, and will continue to do that. And then an oil and gas, through work that we've had done for our corporation in and around Icy Bay, some confidential material that I can just briefly allude to indicates that underneath the Malaspina Glacier, there are very favorable formations for oil and gas traps. Not far underneath, slightly underneath the Malaspina Glacier on the western side.

Mr. HARVEY. Thank you. any other comments on the energy values? Yes?

Mr. WICKES. Yes; please. Jim Wickes, Department of Natural Resources. In terms of statewide resource inventories, for the Andrus proposal, the roughly 1 million acres that fall within defined, commonly agreed upon oil basins, roughly half of that acreage is determined to be of fairly significant value, in the top 40 percent of the State. In terms of coal resources, the Udall proposal——

Mr. HARVEY. Would that be, Jim, in the Copper River Basin or would that be down on the coast?

Mr. WICKES. I think it's closer to the coast, the better stuff. Right. The Copper River lands would probably be in the bottom part of our ranking, on a statewide basis.

Mr. McKEEVER. Can I respond to that?

Mr. HARVEY. Yes.

Mr. McKEEVER. Well, there are significant differences between the two areas. One is that the Copper River has, as I stated earlier, more shows per well than does the Gulf of Alaska wells, although the Gulf of Alaska is still a very significant resource. I feel that the State has misjudged their appraisal. It's—sometimes I think it's interesting to reflect on this quotation, which I take from a USGS professional paper No. 1015: "Mineral exploration is a damn tough business, answers are not spewed out of black boxes. The state of the art will always be stretched and challenged beyoind its reasonable limits, and the ability of black boxes to provide answers will be oversold."

Mr. WICKES. Mr. Chairman, I might add, the State would welcome any additional information that AOGA or any of the other oil companies might want to provide to help update our assessment which is presently underway.

Mr. McKEEVER. The information I have given you is all in public records and most of it available at this time.

Mr. HARVEY. I don't think you're necessarily contradicting each other at all.

Mr. McKEEVER. No; we're not.

Mr. HARVEY. He's saying more acreage in one place, you're saying more oil in some places. That's it. Yes?

Mr. LEEDY. Fish and Wildlife Service. Jim, do you have statewide statistics for coal in the Tetlin area, as opposed to the rest of the Wrangell proposal?

Mr. WICKES. Yes. We find no identified coal lands within the Tetlin Wildlife Refuge proposal.

Mr. LEEDY. Pardon me. What did you say?

Mr. HARVEY. He said, "no coal in the Tetlins."

Mr. WICKES. As the Andrus boundaries are drawn.

Mr. McKEEVER. Well, to get back to oil and gas for a minute, in the Tetlin and Chisana Preserve areas, although it seems to be part of what we call the Upper Tanana Basin, and it may not be widely know that the two wells on the east side of that basin, these wells are shallow wells drilled for other purposes, did discover gas.

They were along the Alaska Highway. They are, so far as is now know, no longer producing properly, lost, abandoned, deserted, but the fact remains that gas was produced in this basin and was used beneficially in the installations along the pipe—along the Alaska Highway.

Mr. HARVEY. Thank you very much. Are there any more comments on the energy and mineral situations? All right. Let's go on to the hard rock area. Who would like to kick off there?

Nonfuel Mineral Resources

Mr. BERG. Hank Berg, USGS Mr. Chairman, my statement will concentrate mainly on the hard mineral potential of the Wrangells, Saint Elias, and Tetlin withdrawal areas, but they'll also generally cover the Copper River Delta area, so unless it's specifically requested, I don't plan on making a separate statement for the Copper River area, OK?

Well, the USGS has published a level II report, describing the metalliferous mineral resource potential of the southern Alaska region, and we included the areas covered by the Wrangells, Saint Elias, and the Tetlin withdrawals. The report was released last month as an open file, No. 78-1E, and copies are available for the committee and, of course, any other interested people. The Survey has also published three level III mineral resource assessments, covering most of the Wrangells and the Tetlin areas. They are, of course, the McCarthy and the Mabesna and the Tanacross folios and these are also available to whoever is interested.

We summarized from our regional report, about 50 percent of these withdrawal areas are underlain by geologic terrains favorable for the occurrence of a wide variety of mineral commodities that occur in several different types of mineral deposits. Some examples are porphyry, moly, and copper deposits in the granitic rocks, volcanogenic sulfide deposits containing base and precious metals of a considerable variety, chromite, copper, nickel, and possibly platinum and mafic and ultramafic rock, and gold-bearing quartz veins and metamorphosed sedimentary rocks. There also are some gold placers along the coast. Very briefly, all told, these withdrawals contain parts of 19 areas that we've identified with geologic potential for metalliferous mineral deposits. For eight of those areas, we've got enough geologic data to allow us to estimate the number of undiscovered deposits, of types, at certain levels of probability. I could list a long number of these, but I think these estimates are adequately described in detail in our published level II and III reports that cover the region, and I think for now, I'll conclude my statement for the moment.

Mr. HARVEY. Yes.

Mr. BANNISTER. This is the area in which we had the most detail to work with as we began field studies last summer. There has been extensive work by both industry and the Geological Survey. Briefly we started out with the geology, which is on this lower map. Then we've added on the first overlay the significant deposits and certain geologic features that are important from the standpoint of understanding the resources. The purplish colored rock unit is the Nikolai greenstone. Plotted alongside it in a red band is the contact of the Nikolai with the Chitistone. The dark brown identifies areas of coal. The areas of the orthovolcanics or other volcanics that could be significant for copper are in orange. Once having established that, then we can draw a map such as the next overlay. It is a more detailed presentation of the areas favorable for metallic mineral development, taking into consideration economic constraints such as access. We have four different qualities most favorable, favorable, on down. These also are divided according to the types of deposits in various portions of the area.

Briefly, the type of most interest, would be the Kennecott deposits. I know you've gleaned where they came from and understand some of their special features. I'd like to comment on that a little bit. They were extremely high grade deposits. They have no alteration or geochemical halo around them, except unless they outcrop. That type of deposit, if it outcrops, can be readily found, but if it does not outcrop, it is very difficult to find. There are many square miles of Chitistone limestone, overlying the Nikolai greenstone. The largest body mined by the Kennecott Corp., which was only about 1,500 feet by 2- to 60-feet wide. You can image the amount of drilling that would be required to test for it, if you don't have some clue as to where to drill. I calculated that it would take 600 holes per square mile, very carefully alined. That's the reason that mining companies still have high hopes of finding another Kennecott. The question of how those deposits got there has never been answered. Until it is known how or why these deposits formed in a certain location, it will be difficult to find them. On the second overlay the red bands indicate where most of the exploration will be, because it outlines the contact of the Chitistone limestone with the Nikolai greenstone, which is the source of the copper. The Nikolai greenstone has an unusually high amount of copper part of which somehow or other, migrated into the limestone.

The second type of deposit are the porphyrys. Typical porphry copper deposits occur on the north side of the Wrangells. We had another small contract there with a consultant from Spokane. We couldn't afford to bring him up and he couldn't afford to come on his own, we'll turn his maps over to you. He has outlined on this map the areas favorable for porphry copper.

Mr. McGregor outlined two porphyry deposits have been known a long time, the Orange Hills deposit and the Bond Creek deposit. There are another four or five deposits to the east. The most significant probably is this hatched area. That is based upon aeromagnetic interpretations and a geochemical anomaly for molybdenum. In the White River area, there is evidence of a buried porphyry copper or perhaps porphyry copper molybdenum deposit of major significance.

Richter of the Geological Survey estimated that deposits in that area would contain 1.2 billion tons of about three-tenths of 1 percent copper, some molybdenum and sufficient gold and silver to receive credits in the smelting. Within the Wrangell proposal, there are other areas that have porphyry type mineralization. They may be of lesser importance.

On the north side of the Wrangell Mountains, there are probably more as yet undiscovered porphyry deposits. On the basis of our own work and the data that's available from the Geological Survey, we doubt that significant major porphyry districts that outcrop remain to be found in other areas, within the proposal boundaries. At this point, I'd like to interject some thoughts on mineral economics in Alaska, which would apply not only here, but to all the areas. There are two components to the difference in the mining costs in Alaska, compared to the lower 48. We talked about these costs the other day. One of those components is the general difference between costs of operation in the commercial or industrial centers, such as Anchorage and costs in the major urban centers in the lower 48.

The other component in getting the supplies and available labor to the mine. Putting a handle on that second cost is difficult, because each mine and mine area, is a special case. For example, the Bureau of Mines did a study not long ago on what would be necessary to reopen a deposit such as the Kennecott if it was discovered anew. The study concluded that it would be unprofitable if it was necessary to build a railroad. However, with a public road available it would be profitable. It is difficult to evaluate the access component of costs, except to say that if bulk transportation is provided to any outlying area such as a road for oil and gas development or some other purpose then immediately costs go down very significantly.

The other component, is the generally higher cost of doing business in Alaska, we can look at that on the basis of projection. There are two ways you can look at the economic forecast. One of them is projection and the other one is prediction. Now, stay away from the latter and look at the rate of inflation in Alaska compared to the lower 48. I have a chart here. It's not up to date. It's about 4 or 5 years old, but it shows that for the 15 year period from 1960 to about 1975, we are closing the gap with the lower 48. Those of us who are federally employed probably remember a couple of years ago when they took away a small portion of the cost-of-living allowance. We can expect it again in the future.

I'd like to explain this chart. These two lines are the rates of inflation, one for Alaska and one for the lower 48. It's simply a projection. You can see that the last trends projected ahead tend to reach zero difference of cost. Maybe it will never reach that.

The third type of deposit is the copper in the Nikolai greenstone. As I mentioned before, there are unusual amounts of copper in the Nikolai greenstone. We noticed certain horizons that are unusually high, more than just a few hundred parts per million, during the study in the past year. This was noted in at least three different situations. One of them was in the float on top. Sometimes the breccia would have an unusual amount of native copper, such as on the Erickson Prospect, east of McCarthy. Another is an unusual prospect just inside the Morton (d)(2) boundary south of Orange Hill, malachite in a conglomerate. Neither of these two appear to be large, but they're worth more exploration. The feature that we're more interested in is the apparent enrichment of certain horizons for great distances.

The best example of mineralized greenstone that we saw is in the Skyscraper Peak area. The greenstones were prospected in the past, but people lost interest in the Nikolai series because no one had found a paying mine. The emphasis shifted entirely to looking for Kennecott type bodies in overlying Chitistone formation. In the Skyscraper Peak area, we could see more because the greenstone is exposed on a narrow ridge, only about 500 feet wide. The lava beds exposed on both sides, include a somewhat discontinuous zone about 800 feet long and 500 feet wide, the width of the ridge. A few specimens from that zone run anywhere from a one-half percent to maybe 30 percent copper. Detailed sampling would be required to estimate an average grade. There are large intervening portions which are obviously extremely low grade, perhaps a few hundred parts per million. However, similar zones appear to extend for miles. I don't know whether any private companies have studied them in modern times, the last 20 years. We feel that the Nikolai greenstones are worth some new thought.

The fourth type of deposit occurs in Paleozoic, island arc volcanics. South of the Orange Hill is a deposit that we think is an example. It is known as the Nabesna Glacier prospect. It looks like massive sulfides in rocks that we have reason to believe are of Paleozoic age and of the island arc type. Originally this deposit was thought to be hydrothermal or related to younger rocks. There is another example, a very good example, in fact, but it's so close to (d)(1) lands that until our report is open to the public we cannot talk about it.

The next type of deposit is placer gold. When you were over there you may have had a chance to go to Dan Creek and look at the placer operation. There has been a significant operation on Dan Creek since the early 1900's. There are three main tributaries of the Nizina River, Dan Creek, Chitistone River, and Young Creek. This is known as the Nizina District. Up to 1959, it had produced 143,000 ounces of gold. The glaciers have removed some of the better placer areas. The miners have removed some of the next best, however, extensive bench placers which have not been mined remain and we do know they have values. We can't estimate grade, but they are very extensive, much more than what has been mined in the past. There is one other placer district in the perimeter area. They did successfully mine a small placer there in the early days. Beach placers are shown on that map, but they are far outside the withdrawal areas. I'm not sure whether other proposals would affect the beach placers. There is gold in the beach placers. Small concentrations form after each major storm.

The final type are the lode gold deposits. The most significant lode gold mine in the general area was the Nabesna Mine near the north border. This is a contact metamorphic gold deposit with modest production, less than $2 million, $35 per oz. Within the area of concern was the Bremner district, extensively developed just prior to World War II and shut down because of World War II. However, the ore shoots are small for the most part and even though the price of gold has risen greatly in the last few years, there has been no apparent activity. I'd like to point out that this deposit has a good arsenic halo readily detectable by geochemical testing. We believe that if there were other such deposits in the shales and grawackies associated with the Bremner outcroppings, we would have found them during the past summer. We find no evidence of such deposits.

Mr. HARVEY. Any more comments on the hard rock minerals?

Mr. JONES. David Jones of the National Park Service. In 1977, the National Park Service awarded a contract to consulting geologist, George A. Moreline of Anchorage, to give a market value estimate of the known mineral interest in the proposed Wrangell National Park. His estimate was $924,000, and I'll ask George to give a rundown as to how many claims and of which type that he did examine.

Mr. MORELINE. Generally, I examined 54 claim groups, some patented and others valid, unpatented claims. Of these, one was a working placer mine in Dan Creek and a considerable amount of money was being spent and has been for the last several years on one of the other claims. So far as the number of placer versus ground claims, I don't have that right at my fingertips right now.

Mr. HARVEY. Go ahead.

Mr. FANKHAUSER. Bob Fankhauser, Alaska Miner's. I'd like to ask George there, how many companies—can you give us an idea, George, since you've been around in that area for a long time. Can you give us an idea of how many companies, major companies, have worked out there and for how long and a ballpark figure of the amount of money they might have spent?

Mr. MORELINE. Are you referring to the entire Wrangells area?

Mr FANKHAUSER. Yes, I'm referring to the entire Wrangells area.

Mr. MORELINE. Well, I've been around since 1961 and certainly there's been activity on both the north and south sides of the ranges since 1961, and in certain—in some years, I'd say there's been $500,000 to $1 million, at least $500,000 spent in some years.

Mr. FANKHAUSER. I'd like to make that further point to the committee, that while George has estimated these particular claims to be at a market value of $924,000 I submit that what we should be considering in this areas is the potential of minerals, not only now, but for the future. I can't argue that there is no major production out there and I can't argue with the fact that it is going to cost a lot of money and—to get these things out, but I think that the fact that major companies have been spending money in there and continue to do so by drilling and so forth, to continue exploration, should be a major point here. They aren't going to be—they wouldn't be spending this sort of money if they didn't think the potential was great, not only for porphyry coppers, but massive sulfides and precious metals. I think it's very important that the USGS has mentioned, but didn't go into very much detail, that the general withdrawal areas that we're talking about here contains 40 to 50 percent highly mineralized lands, having minerals—having lands for mineral potential, excuse me, and there are documented literally hundreds of occurrences of various types. This is a highly geologically active area, both for glaciers and also for mineral exploration of various companies.

Mr. HARVEY. Do you have any idea. The numbers here apparently aren't in dispute in terms of orders of magnitude. Of that half of the area that is heavily mineralized, how much of it would be like under the—under ice at the right—getting up to the tops of the mountains?

Mr. FANKHAUSER. Well, I couldn't give you any direct figures, but, of course, what might be under the ice is based only on projections of outcropping occurrences on either side of the glacier and I would really have no——

Mr. HARVEY. You can mine under the glacier, too?

Mr. FANKHAUSER. Yes, sir. That's been demonstrated in numerous areas elsewhere, some places like Gran Due and there, you know, again, it takes a high percentage of metal in the ground it justify these costs, but again, you know, companies have not been discouraged by the rugged topography and the fact that nothing has come out of their efforts in the last few years. Maybe there are others who could comment as to specific areas, but I think for this time——

Mr. BANNISTER. In that area, there is not only the ice, but there is the younger Wrangell lavas, which have about the same effect. They cover much of the area that might have the Chitistone-Nikolai contact beds, for example. Although you could mine under it, the problem is how to explore and find the target.

Mr. HARVEY. Yes.

Mr. BANNISTER. I might mention one thing. Maybe you noticed this when you were out there. This is about the most environmentally compatible type of mining you could imagine. Those were very tiny holes from which they took the wealth that sustained two or three towns and a whole railroad company. If you were to achieve the production of that small mine in Arizona, you would have to mine about 120 million tons, instead of only about 4 million tons.

Mr. RENSHAW. Mr. Chairman?

Mr. HARVEY. Yes?

Mr. RENSHAW. This is an important point, I believe. The Kennecott deposits or Kennecott type of deposit was one of the richest per cubic foot values ever found on the face of the Earth, concentrated natural wealth in a confined area. That's the incentive for further exploration, exceedingly rich, concentrated deposits.

Mr. HARVEY. Thank you. Yes?

Mr. HOFFMAN. Barry Hoffman, Alaska Miner's. I'd just like to comment on a few areas that nobody has really touched on, particularly the Tetlin withdrawal.

Mr. HARVEY. Go right ahead.

Mr. HOFFMAN. We would project from occurrences to the west, that this area has a potential for deposits similar to the Arctic camp-type deposits, where they have $3½ billion in the ground and the same belt of rocks go into this area, although they are low hills and it's very hard to explore in there. There has been and will continue to be active exploration in that area. In addition, uranium was supposed to be covered under energy, but I'd just like to make a few comments. There are numerous other areas, upper Chitna Valley has been talked about as having some uranium potential, the—again, the Tetlin withdrawal.

Again, to the west, we have a potentially significant uranium occurrence and the same type of setting goes into the Tetlin withdrawal. Also low gold, although it has been mentioned, there are probably numerous other gold occurrences similar to the Nabesna and Beaver Creek occurrence, and these have not been fully evaluated and with the increased price of gold, they will be and similar type deposits could be mined. Also, the chromite potential of the area should be mentioned, the pipes of ultramafic rocks that are found within the proposed withdrawals contain usually small, but very high grade chromite deposits and these similar type chromite deposits are being mined in the world now. They have a very good chrome to iron ratio and I'm sure you all realize that chromite is one thing the United States is deficient in.

Mr. BERG. Mr. Chairman?

Mr. HARVEY. Yes.

Mr. BERG. Hank Berg, Geological Survey. To respond to your question about how much of that 50 percent of these areas that are geologically favorable for mineral resource potential, it's covered by ice, remember? Looks to me like about 40 percent of those terrains are ice covered, however, these terrains—none of the terrains are covered by Wrangell lavas. We drew these boundaries in areas pretty much away from the lava. The lava was simply deemed to be too thick and we didn't know enough about what was going on underneath it.

Mr. HARVEY. Yes, go ahead.

Mr. WICKES. Mr. Chairman, Jim Wickes, Department of Natural Resources. Statewide survey basically corroborates the testimony here that roughly half of the present Andrus Park and preserve proposal has some hard mineral potential. The best of that, some 6.7 million acres with that potential, in the top two levels of the statewide survey comes to roughly 2.4 million acres, which is shared fairly evenly between the park and the preserve designations as drawn by the Secretary. The Tetlin proposal has roughly 80 percent of the million acres of the Andrus proposal, as having some potential for hard minerals, but it is generally less valuable than that to the south.

Mr. HARVEY. Thank you. Did you have a question? Yes?

Mr. SHANE. To start out with, Jim, according to a summary that I have of your computer printout within the Andrus Park proposal for the Wrangells, the acreage of significant mineral lands, which would be the top 20 percent, by your figures, comes out to be 1.8 million acres or approximately 5.7 percent of the significant mineral resources of the State of Alaska.

Mr. WICKES. You are reading off the 1976 assessment?

Mr. SHANE. This is 1977.

Mr. WICKES. 1977.

Mr. SHANE. The 1976 assessment would be 4.6 percent.

Mr. WICKES. You've put it in a statewide context?

Mr. SHANE. Yes.

Mr. HARVEY. Any other comments? Go ahead. I thought you were through.

Mr. SHANE. I'd like to look at the minerals in the Wrangells in a little bit different perspective. First, looking at identified resources and then looking at the hypothetical expectancy of resources. As we've heard, within the Morton Park proposal, which encompasses only a part of the area we're talking about, the Park Service appraised known claims at something under $1 million, and since there is a producing gold placer at Dan Creek which D'Arcy referred to, which, by the way, employees about three or four people on a seasonal basis, it would seem that much of this million dollar value would probably be found from the producing gold mine.

If you look on the north side of the Wrangell Mountains, to the north side, the best know and most talked about resources there are the porphyry coppers. The USGS studies, the AMRAP studies, indicae eight known porphyrys, of which six are of an estimated grade of about 0.21 percent and are of low tonnage. These are, unless additional discoveries were made, the know values here are really not significant. Two of the eight porphyrys are of higher tonnage and grades. These are Orange Hill and Bond Creek, and these are uneconomic to mine at present. To give it some perspective, to use the Bureau of Mines study that I referred to yesterday of the hypothetical copper mine at Lake Clark, that study came out with the conclusion that it would take a copper price something over twice the present price, if it were $1.12 per pound of copper, to make that a producing mine. If we look at the models used for Lake Clark and try to apply it to the Orange Hill, Bond Creek deposits, we find that there's a number of differences between the known identified resources of Orange Hill, Bond Creek, and those at Lake Clark. The hypothetical deposit at Lake Clark is assumed to contain 714 million tons of copper ore, averaging 0.5 percent copper, and 0.13 percent molybdenum

The Orange Hill, Bond Creek deposits are estimated by the USGS, and this is from the AMRAP figures, at 320 and 500 million tons indicated at an inferred tonnage each, averaging a considerably lower thirty-five one hundredths of 1 percent and 0.30 percent copper, with a 0.02 percent molybdenum credit. As a result, points—As a result, between 30 and 40 percent more must be processed at Orange Hill or Bond Creek to produce and equivalent tonnage of copper at these Wrangells deposits, compared to Lake Clark, and this is using the Bureau of Mines model. And total tonnages are substantially lower, unless both porphyrys can be operated together, using common facilities. If you look at the transportation route to tidewater is somewhat longer than they are at Lake Clark, however, much of the intrastructure is in place in the form of highways.

The general conclusion would be that, based on identified known resources at Orange Hill, Bond Creek, the largest known porphyrys in the north Wrangells, you'd have to have a copper price considerably above that estimated in the Bureau of Mines' Lake Clark study, considerably above $1.12 per pound, plus or minus 20 percent and considerably more than twice the going price for copper. Now. I admit and I understand that we have not identified most of the mineral resources of the Wrangells region, but I think we can get an understanding of their relative importance by looking again at the copper porphyrys, which are the—one of the resources that have been most discussed.

The USGS has given estimates of tonnage and grade probabilities for both McCarthy and Nabesna Quadrangles. If you take the median estimate of the Nabesna Quadrangle porphyry deposits as estimated by the AMRAP program, you come out with 5.4 million tons of copper, which was the dominant mineral commodity in those deposits. Then you find about the same thing on the south side in the McCarthy Quadrangle. Chitna Valley, for a total of approximately 11 million tons of contained copper, plus or minus, which is a lot of copper.

However, if you look at the total U.S. domestic copper resources, look at, for example, USGS Professional Paper No. 820. you find that this 11 million tons amounts to approximately 2 percent of the domestic U.S. copper resources. Furthermore, in my discussions with Dennis Cox, who used to be with USGS and I believe now is with Office of Technology Assessment, he explained to me that in his discussions with knowledgeable geologists that the hypothetical and speculative resources as published were probably small be an order of 3 or 4 or possibly more. So if you use those figures, the total contained copper in the Wrangell Mountains region in copper porphyry, using the median estimates of the USGS, comes to something less than one percent of U.S. copper resource and if you refer to the——

Mr. HARVEY. Excuse me. Are you saying Mr. Cox said the numbers were too high?

Mr. SHANE. He was saying that the published USGS figures——

Mr. HARVEY. By a factor of anywhere from 1 to 4 or that they could be in error by a factor of between 1 and 4?

Mr. SHANE. He said that his informal discussions with geologists indicated that the copper resource of the United States in the hypothetical and speculative categories have been underestimated in the published USGS literature by a factor of 3 or 4, and this, of course, is not—the USGS figures are more conservative and more close. My point is that you have a low percentage and when you throw in the cost factors of development, the relative priority of these doposits becomes even lower.

Mr. HARVEY. Yes?

Mr. FIELDS. Ed Fields of the Alaska Miner's Association. I'd like to make some comments on the economics of the region. One reason that it looks particularly attractive is the fact that there is a good intrastructure network of road ways in the area. You have the roadway going down the west side of the area, you've got a railbed going into the Kennecott area, which could be upgraded at a relatively low cost. You've got roadways going into Nabesna, and particularly on the north side, you've got the Alaska Highway with a potential of a trans-Alaskan rail route, which may run down that area at one time, which would make these deposits on the north side much more attractive. So I would suggest that this area has received a lot of attention, primarily because of the fact that it is—has a good intrastructure designation in comparison to the rest of the State.

Second, in terms of economics of these deposits, Kennecott Copper Corp. has been doing research studies on insituleaching, which is a much lower cost method of extracting copper and also it is probably less environmentally degrading and maybe these deposits may have this type of potential for insituleaching, where they have somewhat lower grades, but they can be leached in place.

And third, I'd like to suggest, we've heard some testimony regarding the size varying amount of contained copper in these individual areas and we say that these represent and insignificant amount of the U.S. copper reserves, but it you look at each area that we've discussed, we have a piecemeal basis whereby we've extracting from one area 2 or 3 percent, we're removing that from potential resource. Another area we go to is 3 to 5 percent. When you take this as a whole for the State, this becomes quite a significant figure, so you've got to put that in perspective of the whole State.

To get back to a specific area, I gave you a map earlier for reference and in reference to that may, on it are mapped key wildlife and key mineralized belts. The key mineralized belt I wish to refer to is the belt that has been discussed considerably already—eight known bodies. That belt, as was known at the time the map was prepared, as indicated on that map. The eastern or western portion of it includes the Bond Creek, Orange Hill area, which is a well known, well established, high tonnage area. I wanted to point out that that belt, as established, is rather narrow belt. Its northern boundary, and this is indicated on the Richter, USGS study of the Nabesna Quadrangle, is roughly equivalent to the height of land, the crest of the eastern Alaska Range and Mentasta Mountains. It extends from the crest—a little north of the crest in some places, a little south of the crest in some places. The south along the various south flowing drainages, to approximately Beaver Creek. I'm now referring to the eastern portion of this belt, which is a belt that extends from Orange Hill, the lower portion of the Nabesna Glacier, east—southeast as a rather narrow belt to the Canadian border and presumably beyond. It has been indicated that since Mr. Richter's work, geochem anomalies or a geochem anomaly has been found to the south of the White River. I can't comment on that. If there's any core drilling information, it's not public. At the time that map was prepared, Beaver Creek was about the southernmost portion of the established portion of that belt. Mr. Richter and lot of other people are well aware and concerned that in the course of the development of the eastern portion of that belt, which is primarily, I say, along a narrow subalpine mountain drainage.

With a clear water stream flowing through it, it would require extreme care, exceptional care, to develop these massive surface pit mines without significant degradation of the fishery values, the landscape values and so forth.

The other thing I wanted to point out is that to the north of this belt, extending to the Alaska Highway, is a vast area of millions of acres, the Tetlin refuge proposal and the northern part—portion of the Wrangells preserve proposal. That belt, according to the USGS maps I have here, is not known or not reported to contain significant mineralization. Now, there are two areas that have been referred to, small localized areas that have a chromium, nickel sediment—stream sediment float potential. This is not an established reserve. There is also—Mr. Hoffman referred to the high Arctic camp type potential and let me briefly indicate—and Mr. Hoffman can correct me if I'm wrong on the approach. Because of the great advance in geologic theory relating to tectonic plates, there has been an inferred and in some cases underground, confirmed, a so-called "Z" belt or Z-shaped belt of enormous magnitude, crossing from one end of the Brooks Range to the other, Seward Peninsula, back into the interior mountains, across the Tanana Highlands and then bask west arcoss the Northern Wrangells and the Alaska Range. This covers and enormous area of the State of Alaska.

It's an inferred massive volcanogenic sulfide zone. It is the type of rock in which the various deposits in the Arctic Camp, Bornite, Picnic Creek area, and the Ambler mineral district in the Brooks Range have been found. That's the only area in the State where significant deposits have thus far been found. That's the only area in the State where significant deposits have thus far been found. Now, I don't question the potential in this belt elsewhere in the State. It may be the greatest geological discovery indicated. All I can say is that it covers a vast area of the State, unless we're just essentially going to forget about the (d)(2) or stay away from the mountains, we're going to be running into it over and over. The known established belt pretty much stops at the crest of the Mentasta Mountains. We have the vast area to the north that is virtually unmineralized as far as any significant minerals are known and I just wanted to point that out. Thank you.

Mr. Hoffman. I'd just like to add, the area I was talking about to the west of the Tetlin Reservation, these are new discoveries made in the last 2 years and I must say that the rocks extend in. They're very similar to Arctic Camp and I think it's safe to say that within this withdrawal, there has been probably at least one new occurrence found each year and there will continue to be new occurrences found. You brought up the state of the art. Well, if you were to draw your map today, it would be completely changed and this is—and next year it will probably change again. We're just making such strides on mineral occurrence identification now.

Mr. Gordon. Sorry to interrupt. Could I just ask a question? Is there any reported or public information on drilling in that area?

Mr. Hoffman. Not public, but there has been quite a significant amount of drilling.

Mr. Barker. Jim Barker, with the Bureau of Mines. The Bureau of Mines keeps records on mining claims on an annual basis. I'd like to point out that within 50 or 75 miles of the area in question here, approximately 2,000 or more mining claims have been staked in the last 2 years.

Mr. Harvey. Any more comments on the hard rock area? Yes, go ahead.

Mr. Fankhauser. Bob Fankhauser, Alaska Miner's. I would like to point out once again that we go through these State estimates of how many millions of acres there are of mineral potential lands and how—and in this regard, how few tons of copper there are in this so far. You can do an awful lot with statistics, and I could put together a set of statistics that indicates millions of tons of copper in the Wrangell Mountains by adding up the known occurrences. Now, the tonnages that both of these estimates are talking about happens to be the only thing you can go by, is drilled out tonnage and I think what Mr. Hoffman is referring to and what the rest of us, in thinking of mineral potential for the future, are referring to, that today's tonnages and today's known deposits do not indicate the potential of the area. I know I've mentioned that several times, but it's the most important point that I think needs to be brought out in this regard. Thank you.

Mr. HARVEY. Thank you. Let's turn to the transportation and access issue, which we've covered a lot of that in various comments with respect to the wildlife and the hunting and the mining and the existing intrastructure in terms of points that we've raised earlier. I would like to let this gentleman make a comment.

Mr. RENSHAW. I would like to enter a correction to my prior testimony, if I may.

Mr. HARVEY. You may.

Mr. RENSHAW. The name is A. L. Renshaw. I was speaking in regards to potential oil shales on the northerly gulf coast. I mention the potential that it may exist on Wingham Island. That was an error. I meant to say Kayak Island, and I would like to enter that correction.

Mr. HARVEY. Fine. Thank you. Jules, do you want to go ahead on the transportation?

Mr. TILESTON. Unless somebody has some specifics, because it just deals with the general area.

Mr. HARVEY. Well, let's just go ahead, then.

Transportation and Access

Mr. TILESTON. Jules Tileston, BLM. The subject of access for mineral entry has come up a couple of times. I'm going to explain what we're doing at this point. In terms of the (d)(2) areas, there has been an interagency coordinating effort involving the Federal agencies, in operation since they were withdrawn. We take an application as it comes in and here, I'm talking about casual use. This is the helicopter, pick and rock hammer or hand drill sort of operation that was being discussed yesterday.

Mr. HARVEY. This is regardless of what mineral is being sought?

Mr. TILESTON. That's correct, and it includes geochem. Earlier there was an example on the uranium studies. Those are coordinated, they're reviewed basically to determine whether the helicopter flight, itself, will conflict with sensitive wildlife areas, raptors, this sort of thing, so that's the first thing. The second thing is the location of any base camps that might be required and then appropriate stipulations by the various agencies are proposed. As a general rule, that is working satisfactorily now, I think, both for industry as a whole and for the State agencies, although there are yearly rough spots on any individual situation, because it is one area that you might want to consider on how cooperative management may or may not work, because this is handled that way.

Mr. HARVEY. And you're talking here again about the lands that are withdrawn under (d)(2)? You're not talking about going on to an existing national park or wildlife refuge?

Mr. TILESTON. That is correct, just those lands which are withdrawn. In terms of seismographs, the departmental policy under the Andus administration is that there will be no seismograph within areas withdrawn for (d)(2) or on (d)(1) lands, which are inside those boundaries. That is the same policy that existed under Morton. Now, what this means, in fact, is that when the gentleman from AOGA was talking about conducting seismograph work in the Copper River Delta or Copper River Valley, there are lands technically that are available for seismograph work. The Department is categorically rejecting those on the basis of having to clear trees and this sort of thing, and this is a stock, so right now we do have a freeze. Even though—and this is regardless of whether that's a part or a refuge or a forest. In other words, it has nothing to do with what the future land use of that area might be. It's the commitment of the Department, both administrations, to maintain the basic integrity of the areas until Congress has a chance. And that means that that will hold, subject to a change of the administration, until Congress does act.

Mr. HARVEY. Thank you.

Mr. FANKHAUSER. I think perhaps it might be worthwhile to clarify this for people's information at this time, if that's all right, because I don't understand exactly what he said.

Mr. HARVEY. Go ahead.

Mr. FANKHAUSER. He said that seismograph work is not permitted on (d)(2) lands and this has been in effect for a long time, and that's true. You also said that it was not permitted on (d)(1) lands within boundaries of (d)(1) lands or (d)(2) lands?

Mr. TILESTON. The Andrus proposal. In other words, any lands that are inside the administration's proposal, regardless of status.

Mr. FANKHAUSER. Well, I don't know what the land is there, but let's look at that thing right underneath Chitna NIR or NLR, whatever it is. Well, assuming that the heavy blue boundary there is a (d)(2) boundary and it picks up on asterisk F, then what you're saying is that you cannot do geophysical work between Chitna and MR and whatever it is, it's two or three townships south of there. In other words, in this area right here.

Mr. TILESTON. This is a no-no, because this is a proposal withdrawal map.

Mr. HARVEY. Any other comments on the transportation and access question? Yes, go ahead.

Mr. FANKHAUSER. Bob Fankhauser, Alaska Miner's. I'd like to get clarification from the BLM on these adjacent or included (d)(1) lands reference to BLM's Organic Act, article 603, which says these plans greater than 5,000 acres, which are defined as roadless areas or to be managed as wilderness. This has caused a fantastic confusion to most of us.

Mr. HARVEY. That's a good issue, but I think it's outside the scope of our discussion here.

Mr. FIELDS. Ed Fields, Alaska Miner's Association. I'd like to submit that on the regional exploration basis, there's a minimal impact on the environment when we're going over broad areas and doing broad regional reconnaissance, and I'd like Jules to comment on what his impressions have been on these permits that he's issued and the impacts that have—any impacts that have been noted, if at all.

Mr. TILESTON. Jules Tileston, BLM. As far as I know, we've had very few conflicts as such and when we do get a report, it's generally straightened out immediately. Some of the reports that we have had, the damage turned out to be that the land wasn't where it was originally reported to be, had trouble with a bad status conflict. But as a general rule, the system, I think it's been operating pretty well in terms of getting all of the professional disciplines involved and getting an input professionally from the wildlife side or whatever it might be, on what will cause the minimum impact and still get the job done.

Mr. HARVEY. Are there any more comments? All right. Go ahead.

Mr. MCKEEVER. I have one more question for the record. Why is it that users of the land who are engaged in mineral, oil, and gas prospecting, or examination, are treated separately from recreational users? Why do we have to get a permit when our environmental damage is certainly no different than the person who walks across the land? In fact, we do a good deal of walking ourselves. Why is this?

Mr. HARVEY. Because Congress thinks there's a difference.

Mr. TILESTON. No, I don't think—this is not a Congress——

Mr. HARVEY. Yes, I believe it is. There's a requirement in law that it be done from mineral activity and not for recreation.

Mr. MCKEEVER. That's correct, and also by regulation.

Mr. TILESTON. Well, certainly by regulation, but I—I could use some help on this, because I don't want to make a big deal out of it.

Mr. MCKEEVER. OK. I'll be glad to show it to you.

Mr. HARVEY. There are some instances where recreationists have to get permits, too, as a matter of fact.

Mr. TILESTON. Yes.

Mr. HARVEY. There are instances of recreation——

Mr. TILESTON. Very infrequently.

Mr. HARVEY. Well, wilderness, for example. In some areas——

Mr. MCKEEVER. In the lower 48.

Mr. HARVEY [continuing]. In the lower 48.

Mr. MCKEEVER. More and more.

Mr. TILESTON. Thank you. There is, indeed, a reservation system in effect with permits and all the rest of it.

Mr. FANKHAUSER. Bob Fankhauser, Alaska Miner's. I'd like to point out on the transportation here that the amount of lands needed for an accessway to an operating mine and the actual amount of land that a mine is involved with in production is very minimal. A square mile of development land is a big mine in a porphyry cooper type system and even smaller for copper sulfide. I'd like to submit to the committee that even though it takes thousands of square miles of good hunting country as far as minerals go, to look for this one needle in the haystack, that you're going to possibly have a chance to make into an operating mine that when that's over and done with, the environmental damage is restricted to local areas and can be rehabilitated and safeguards for downstream waters and so forth taken care of. I would like to submit that the committee keep this in mind on multiple uses in these areas.

Mr. GORDON. As a matter of clarification, if the State Department of Transportation can indicate with regard to the Wrangells area, what the Hammond administration policy is on the withdrawal or identification of corridors and the activities, any intended for the right-of-way between McCarthy and Chitna. These are two separate questions.

Mr. HARVEY. Do you have a key man here?

Mr. THOMAS. I'm Bob Thomas, Department of Transportation. I'm the planning manager for the north of the Alaska Range and on the southern part of Alaska, I'm not very knowledgeable, but I think we will be presenting a written response to this later.

Mr. HARVEY. Fine. Are there any more comments on transportation and access? Yes?

Mr. PROPST. Yes; Carl Propst, Chugach Natives. I missed the majority of your discussion on this topic, but I'd just like to say that surveys of our stockholders in the Prince William Sound area, in the city of Cordova and the villages of Chineega and Tikikluk indicate that the majority of them favor the construction of the Copper River highway. Our corporation and the village corporations for Tikikluk and Eyak own a large percentage of the lands that would straddle a future Copper River highway and we are willing to cooperate in any way to have the road built. As many of you know, the prices in Cordova are just prohibitive. A lot of people leave Cordova and especially a lot of people leave the small villages in the Prince William Sound because of the prices that could be significantly reduced by the highway. Thank you.

Mr. HARVEY. Thank you. We'll turn to the Copper River Delta area.

Mr. SHANE. Before we do, I just got a note from a person in the audience who is a resident of McCarthy that says that all he's hearing is professionals and he would like to have a chance to make some comments, if it is appropriate?

Mr. HARVEY. As long as they identify themselves, they sure can.

Mr. GREEN. Well, I didn't really mean to put myself in this position, but I guess I have. My name is Lloyd Green and I'm a resident. I've lived in the Wrangell Mountains for approximately 15 years. I've been connected with mining companies, during the height of the major mining company in the Wrangell Mountains, mining activities, and I see things, very frankly, as just a person and I'm in communication with most of the people that live in the immediate McCarthy area and I think perhaps if it could be considered, that the people that live in the area are part of the area. They're the personality. If people go into the area and see the country, they also will see the people that live there. In some way, sometimes we have different—little different concepts of what is actually happening or what is potential, including people that are interested in its economics, for example, or even its recreation, from an outside point of view.

But as I see recreation, people that come in from a recreational point of view are immediately going to be confronted with the people that live there, so the biggest issue, as I see it and most of the people of the area, is just access and that's the biggest issue at present.

Most of the people, frankly, that I know, and I know them well, that live in the Wrangell Mountains are very concerned about the access into their country. Not because they don't want to get there, themselves, but because the means of transportation has a great deal to do—or the means of getting there has a great deal to do with the environment or—well, to put it very simply, as an example, a few years ago the McCarthy Road was completed and the bridges were completed into McCarthy. The road was open for approximately 6 weeks and in that 6 weeks, the people that arrived to McCarthy really never arrived there at all, because it so dramatically changed McCarthy that they really didn't see what they thought they were going to see. Then the bridges washed out and for the last 3 years, we've had no bridges, and since then we've had a great number of people move into McCarthy, quite a number. In fact, this last year was the biggest boom we've had in population since 1938, I believe. Most of the people that live there now realize what a valuable asset they have by not being able to have traffic flow into McCarthy. So looking at it from a resident's point of view, I think transportation is a high priority of how you open up the country for people.

Mr. HARVEY. Thank you. Anything else? Yes; this gentleman right there.

Mr. RENSHAW. Yes. A. L. Renshaw. I would like to comment on the potential access for coal development. I think it's quite significant. To produce coal from the Robinson Mountian areas, it likely would have to be transported to the west to the Controller Bay area for port facilities. The most likely means of transporting the coal would be by slurry pipeline. This has been studied for development of the Bering River fields, and, it's been surveyed at the Martin Islands near the west end of Katalla Bay. There is sufficient water depth there, subsequent to the 1964 earthquake, to accommodate vessels drawing in excess of 60 feet. It would take vessels like this to enter the world commerce with this coal.

COPPER RIVER DELTA

Mr. HARVEY. Thank you. Let's go to the Copper River Delta area. We've covered some of this before, there's been some overlap here. Does anyone have anything to add to the discussion of the scenic, landscape and environmental values? Yes, go ahead.

Scenic, Landscape, Historic, and Archeological Values

Mr. LEEDY. Bob Leedy, Fish and Wildlife Service. I'd say that a little of what was said this morning regarding scenic actually applies to the Copper River Delta area. The Copper River is far more affected by coastal climate. Someone did mention the fact that it rains a lot down there, a very lush area, very rich. The Copper River, as it leaves the mountains, is a very large, braided channel, braided delta, that verges with glacial outwash plains to the east and throughout almost the entire area, very extensive marshlands, tide flats. You can have your feet in salt water with glaciers behind you, and be looking across ponds with a variety of marsh grasses and you see large, almost sea level glaciers from large areas of the marshes.

The eastern delta, the Bering River/Controller Bay area, is different in nature from the part of the Copper River that most people see. It's an area of isolated mountain islands, surrounded by marsh areas. It's kind of sunken valleys, if you would, that are—that have been covered by glacial outwash and river sediments and it is a treat that is difficult to describe, and few people have probably achieved, to stand down in that area in the spring and perhaps look over literally acres and acres of wild iris and shooting stars, looking in toward the mountains in the Coastal Range for perhaps 2,500 to 8,000 feet.

As one final comment, I would also like to say that where we've been talking of scenic values, to date, we've been talking primarily only of visual values. I would hope that scenics could also be expanded to include other aspects of esthetics, such as sounds. Wildlife obviously are part of the scenic values. Copper River Delta is an area where it is not at all uncommon perhaps for a person to sit down in one place at one time and concurrently hear ravens, bald eagles, geese, cranes, all calling at the same time, while viewing some of the most miraculous sunrises and sunsets over the mountains which can be imagined.

One comment on archeology here would be warranted. Very little is known about the archeology of the Delta area, itself. There's never been, to our archeologist's knowledge, a systematic survey of the delta, however, it's probably safe to say that an area as lush and rich in resources would certainly have good potential for archeological resources.

Mr. HARVEY. Thank you. Yes?

Mr. BEAL. I'm Clay Beal with the Forest Service. The name, Copper River Delta, is sort of a misnomer for the entire area that's included in the refuge and the delta portion that Bob Leedy just described is a part of it. That's backgrounded by these glaciers that come in from the north and the Bering River and Copper River Deltas are separated by a north/south range of mountains called the Ragged Mountains, which are in themselves quite spectacular. On the eastern edge is the Bering River, the Bering Glacier that comes in and is the head of the Bering River, and even by Alaskan standards, this is one of the largest glaciers in the State.

To the north of that is the Martin River Glacier, that comes down and runs into the Copper River, another rather outstanding glacier. What hasn't been mentioned also is that offshore islands, Kayak Island, Wingham Island, the sandbars that are offshore are sort of unique to this type of topography in the State. As far as historical values are concerned, there hasn't been much done with the archeology. Certainly there was a Native group, the Eyaks, which were in the mouth of the Copper River, but in 1741, Bering's expedition to the United States or to the Alaskan area put the first known white man on Kayak Island, which lies within this area. But the railroad into Kennecott is one historical feature that lies within the area. Parts of this have been nominated for the national historic records. The refinery there at Katalla and the oilfields have also been nonimated. I guess they're actually historical monuments within the area.

Mr. SENNER. Mr. Chairman?

Mr. HARVEY. Yes.

Mr. SENNER. I'm Stan Senner with the Alaska Coalition. Four brief points about scenic values. One has been made by several of the people, is this combination of a flat delta with the mountains rising abruptly from them, and the way that this is seen best, I think, is after you've been fogged in for 5 days on the delta and suddenly everthing lifts and there are these mountains and glaciers coming right down on top of you. The second one which hasn't been mentioned is Cape St. Elias, which can be viewed from places like Katalla on a clear day, and it's really spectacular catching sunsets, for example.

Wilderness qualities on the east side of the Copper River are very high and this is something the Alaska Coalition is quite interesting in. Finally, I think maybe most significantly here in the Copper Delta is that I don't know of any place that I've been at in the lower 48 or even in Alaska where you can view the phenomenon of migration more spectacularly than in the Copper Delta. If you, for instance, stay in a Forest Service cabin out at Tedamen Slough or Allegheny Slough or whatever, in the first week in May, you can literally any time of the day or night step out of your cabin and see or hear whines of cranes and whistling swans, whatever it is, going overhead flock after flock, and I don't know of any place in the country where there's such a concentrated activity in such a short time that's evident and accessible to people.

Mr. HARVEY. Thank you.

Mr. LEEDY. I'd like to highlight a point Stan made on accessibility. While there is not road access to the area, there are a number of daily flights to Cordova from Anchorage, good ferry service, and the area is—it has always amazed me how little known it is, even within the State, but more and more people are becoming aware of the values and more and more people are moving into the area and it will see a marked increase in tourist and recreational traffic regardless of any other activities in the future.

Mr. HARVEY. When you say more and more people are moving in, can you give use an idea of the magnitudes of that?

Mr. LEEDY. Well, now the population of Cordova has maybe doubled in 10 to 15 years.

Mr. HARVEY. From what to what?

Mr. LEEDY. It's still small. Maybe 1,500 to 3,000 people.

Mr. SENNER. Depends on whether it's crabbing time or not.

Mr. LEEDY. That does make some difference, yes. It expands markedly in the summer.

Mr. HARVEY. OK, any other comments on the scenic and landscape values? Yes, go ahead.

Mr. McCURDY. I just wanted to mention the population dynamics of Cordova, they aren't tourists. Some are fishermen.

Mr. HARVEY. Identify yourself, please.

Mr. McCURDY. Oh, excuse me. Mike McCurdy.

Mr. HARVEY. When you say fishermen, they're commercial fishermen?

Mr. McCURDY. Commercial fishermen.

Mr. HARVEY. Yes.

Mr. McCURDY. There were some—I'd estimate last year 50 people came through there to fish for silvers on the Eyak River.

Mr. HARVEY. All right. Let's go to the wildlife. Did you have something to add?

Mr. BEAL. No; I was going to go to the wildlife.

Mr. HARVEY. All right. Well, the wildlife values in the area. Go ahead, and the uses, too. Go ahead

Wildlife and Fish Resources and Uses

Mr. BEAL. Yes; I'm Clay Beal with the Forest Service. We've been involved in the past year in a detailed unit plan of the Copper River unit, which lies from Cordova east to the boundaries of the national forest, and I'd like to have Lee Culvertson, who is our wildlife biologist, tell us a little bit about that.

Mr. HARVEY. Do you have a map you want to talk about or——

Mr. CULVERTSON. Yes.

Mr. HARVEY. Go ahead.

Mr. CULVERTSON. I'm Lee Culvertson with the U.S. Forest Service. I'd like to enter our report entitled, "The Wildlife and Fisheries Resources of the Copper River Delta Planning Unit." The planting unit that Mr. Beal just mentioned that the U.S. Forest Service is presently conducting a land use plan for. This report covers the area from Cordova to the Suckling Hills, so although it's entitled Copper River Delta, it's referring to the area from Cordova and including the Controller Bay, Bering River drainages, to the Suckling Hills and north to the national forest boundary. it contains the details of our resource inventory on wildlife and fisheries for that area, so I won't go into a great deal of detail, just hit some of the high points. I'm sure some other individuals will be able to expand on that. As has already been mentioned, the area's primary value or interest to people wildlife-wise is in the waterfowl that use the area. Approximately 20 million birds migrate through this coastal lowland in spring and fall. That's waterfowl, including geese, cranes, shore birds, ducks, and so on. There are 10 sea bird colonies in this coastal area from Cordova to Cape Suckling that support or provide nesting sites for approximately 120,000 kittiwakes, gulls, puffins, and other sea birds.

Densities of as many as 250,000 shore birds and waterfowl per square mile are found in critical habitat areas in the inlet and in portions of the delta, which are essentially tidelands that are covered by the seas and uncovered daily, very shallow waters, productive esterine zones. Of particular import, two species of waterfowl are the dusty Canada goose, which has a postseasonal or a spring population of approximately 20,000 birds that—a portion of which nest entirely on the Copper River Delta, a few individuals nesting in the Bering, Controller Bay area, and this is the only nesting area of this particular subspecies of Canada goose in North America. Its special importance—one aspect of its special importance is that it's an important population that's hunted to the south in Oregon especially and winters in the Willamette Valley. The trumpeter swan has concentrations of nesting birds in the Bering, Controller Bay area and in the Copper River Delta, itself. Approximately, between those two areas, 100 pairs of trumpeter swans nest annually. The birds are on hand during the breeding season and summer season are approximately 750 individual birds, total. Again, those figures can probably be corrected or more accurately presented, but I'm only presenting rough figures. Two significant areas here that we have identified in previous years have been managed cooperatively, in that approximately one-half million acres of this delta area, essentially, in the Bering, Controller Bay area and the delta—Copper River Delta, itself, are under cooperative agreements that have been worked out between the Forest Service, the Alaska Department of Natural Resources, the Alaska Fish and Game Department, and the U.S. Fish and Wildlife Service.

Those half million acres are shown here as these cross-hatched areas. Because of the extremely high value coastal wetlands here, we have been involved in studies, ongoing, by the University of Alaska on dusty Canada geese, other studies being conducted by the University of Minnesota on the vegetation of the delta, especially with respect to the changes that may or may not have taken place since the uplift during the earthquake of 1964. We presently have—the Forest Service has a wetlands biologist and staff which varies depending upon field season or winter season, but its primary responsibility is the management of waterfowl resources or habitat here in the delta and the facilitating of research and other studies ongoing in that area. Other species, I'll mention only briefly. They're important on a statewide basis, not so much on an international or national basis as the dusty Canada geese and trumpeter swans I mentioned earlier. The State's most productive moose herd is found in the Copper River Delta. A similarly very productive moose herd is found in the Bering, Controller Bay area, providing extremely good trophy bull moose hunting. The fish and game department can expand on that, I believe.

Mr. WILLIAMS. Excuse me. Did you say the most productive moose herd in the State?

Mr. CULVERTSON. Yes. Productive meaning the number of calves produced per 100 cows on an annual basis. That doesn't mean that that's the largest herd, by any means.

Mr. WILLIAMS. No; I understand that.

Mr. CULVERTSON. It just means they're extremely productive. Mountain goats are found in the higher country away from the wetlands, in the vicinity of glaciers especially. Significant huntable populations are found there. Brown bear are not uncommon in the same area, from Cordova to the Suckling Hills, not large numbers being harvested. Black bear are found here and, of course, a variety of nongame birds and mammals, fur bearers, and so on. Wolverine, martin and beaver. I'll mention just momentarily the fisheries that are here. There's a significant fishery that passes through the area, but spawns primarily in the interior and the Copper River basin, but approximately three-quarter million salmon a year are taken in the vicinity of the mouth of the Copper River. These are primarily sockeye and king salmon and in the Bering system, the Bering River system, approximately 80,000 fish are taken a year, sockeye and silver salmon, and these are spawned and initial growth takes place within this area we're talking about, rather than in the interior. And I think, with that, I'll conclude my remarks.

Mr. HARVEY. Thank you very much. Anything further?

Mr. LEEDY. Yes. Bob Leedy, Fish and Wildlife Service. I'll try not to be too repetitious, but I do want to add a little bit more and correct a few figures. No. 1, it's—the forest service is being unduly modest. The Copper River Delta provides a diversity of terrestrial and fresh water habitat found in few other areas to a similar extent. The marshlands, combined with associated marine and upland habitats, constitute what is almost assuredly one of the most spectacular fish and wildlife areas in North America. Speaking first to migratory birds, I'll say that there are approximately 180 species of birds recorded on the Copper River Delta. Ninety-eight of these are water oriented and most are migratory. The area presently contains, as stated, the entire world population of nesting dusty Canada geese and presently 20 percent of the world's breeding trumpeter swans. The density of ducks is among the highest of all areas within Alaska, and localized densities of bald eagles are similar to those found in prime habitats in southeast Alaska. Another tidbit, the Copper River Delta also supports the highest known concentrations of breeding Aleutian terns in the world. Perhaps more important, almost certainly more important in some people's minds, and even these outstanding breeding populations, is the use of the area by staging and—the use of the area as staging and feeding area for migratory waterfowl and migratory birds. It was stated that about 20 million water birds of all kinds used the area—I mean, passed through the area in spring and fall. I might say that's about 20 million shore birds staged in the area during spring, as many as 1 million waterfowl passed through the area in spring.

In fall, after the breeding season, there are 40 to 50 million shore birds passing through the area and as many as 2 million waterfowl. The waterfowl are primarily a variety of ducks, whitefront geese, dusty Canada geese. The majority of the shore birds are dunlands and western sandpipers and a variety of many others, and up to 500,000 sandhill cranes have been reported staging in the Martin River Slough area in fall. I will touch more on the cranes a little later here. I would now like to comment on three items of probably specific concern in the area.

One is the trumpeter swans. First of all, the figure cited was 100 breeding pairs. U.S. Fish and Wildlife Service biologists flew the area in 1975 and revealed that there were 442 breeding pairs in the Copper River Delta/Bering River area and 56 pairs in the Copper/Bremner area. It is felt that these populations have pretty well saturated available habitat at this time. The time of the earlier survey in 1968, the swans in the Copper River Delta area, Bremner area, constituted approximately half of the—well, 40 percent plus of the population in the State. The statewide population has increased markedly in the 7 years interim there, and it is felt that the stable populations in the Copper River Delta area have been at least partially responsible for contributing to the increase of these birds elsewhere in the State. Also the populations of the Copper Delta have been extremely stable and may very well reflect the importance of this coastal habitat in providing a buffer for the vicissitudes of climate in the harsher interior.

It also appears now, after Alaska Native Land Claims is settled and State selections are complete, that approximately 87 percent of the habitat occupied by trumpeter swans in 1975 will be removed from Federal ownership, about 7 percent is in the Copper River, Bering River area. Twenty-one percent of the total population breeds in this small area, thus it's very obvious that of the total population—I mean, that of the total trumpeter swan habitat remaining in Federal ownership, the majority of its important lands would be under Federal ownership. I might add that the other 6 percent of Federal lands are primarily Fish and Wildlife Service lands in the Kenai Moose Range. The dusty Canada geese, as stated, breed only in the Copper/Bering River area and winter in the Willamette Valley. There's some concern for their future in particular, because of earthquake uplifts that occurred in 1964. The whole Copper River area marshlands, a delicate system tied in with the sea, was uplifed about 6 feet. There's increased erosion, some increased drainage and increased vegetational succession, very rapid vegetational succession to a brush community. In recent years, however, the birds have fared very well, had very high fall flights and it would seem at this time that it's necessary to have continual population ecology studies going on in the area, but it's a little too soon to know of any habitat manipulation without knowing better the dynamics of the birds.

I might also add that the Fish and Wildlife Service does have a major responsibility for population ecology studies, and if I'm not mistaken, it was Fish and Wildlife Service that funded the study of dusty Canada geese down there. We funded barley, didn't we?

Mr. HARVEY. At the courtesy of the American taxpayer.

Mr. LEEDY. Ducks in the area have provided kind of a problem in recent years, because right after the earthquake, people—initial surveys indicated a drastic decline of ducks. More recent surveys have shown that, if anything, the dabbling ducks—I've referred to these earlier, and puddle ducks. These are things like mallards and pintails and things like this that just require very shallow water. They have maintained about stable. Diving ducks have declined to a great degree, but it's still possible that present estimates of total breeding ducks indicate a greater decline since the earthquake had actually occurred, and we then stress the need for more population ecology studies.

Mr. BEVINETTO. Briefly, for me, run through again the populations on the trumpeter swans, specifically the percentage of trumpeter swan habitat that you stated would be outside of Federal ownership, its relation to the State population and that relation to the national population?

Mr. LEEDY. OK. After Native selections and State selections are completed——

Mr. HARVEY. In all of Alaska?

MR. LEEDY. In all of Alaska, it appears that 87 percent of existing trumpeter swan habitat will be out of Federal ownership. Federal Government will manage land, 13 percent of the habitat in the State. Seven percent of the habitat is in the Copper Delta/Bering River area. The other 6 percent is primarily in the Kenai Moose Range area. Let's see, this 13 percent, this 13 percent of the land produced 20—had contained 27 percent of the total breeding pairs, statewide. Let's see, and of that, 21 percent of the total State population occurs on the Copper River Delta, Bering River, Controller Bay area. OK.

Mr. BEVINETTO. Now, give me some numbers of birds.

Mr. LEEDY. Numbers of birds. Approximately 442 breeding pairs in the Copper Delta, Bering River area. That's breeding pairs.

Mr. BEVINETTO. Yes, and its relation to the total Alaska population and the national population, that's what I aked for.

Mr. LEEDY. Oh, I'm sorry. Total Alaska population, I have exact figures here somewhere, but it's in the neighborhood now of about somewhat in excess of 2,000 breeding birds and maybe 4,400 birds, total. The Alaska population constitutes, I believe, about—I believe about 80 percent of the total national population. The main area outside of Alaska most known for trumpeter swans being Red Rocks Lake Refuge in Montana. I could speak more to the mammals in all of the area, but I'll let that go for the time being.

Mr. HARVEY. Any more comments on the wildlife?

Mr. SENNER. Yes. Stan Senner, of the Alaska Coalition. I think it's worth spending a couple of minutes on telling you why, biologically, this area is so important and the reason is fairly simple. If you look at the stretch of coastline from Vancouver all across Prince William Sound, over toward the Kenai Peninsula and so on, there are very few areas that are not steep rocky coast. The forest comes right down to the intertidal bounds. They're rocky, there's not much in the way of mudflats associated with them. The Copper Delta, there is no area of comparable size in that whole stretch of coastline, if you count together the Copper Delta and that Bering River Delta and if you then go over to lower Cook Inlet, you'll find a smaller area of similar habitat, for instance, Katchemak Bay, but there's nothing on the scale of the Copper River Delta. Now, its importance for birds, then, is if you look at shore bird migration. We have western sandpipers, for instance, wintering all the way from Peru, the northern coast of South America, we have dunlands all through the Pacific Coast States in the lower 48. OK. They're migrating as far north as Vancouver and then the best evidence at present indicates they're making direct overwater flights all along that northern coast, because there is, for one reason, no—there are few good places for feeding habitats all along that stretch, so the Copper River Delta is the first place they hit, it's their first landfall in Alaska after flying 1,200 kilometers or whatever it is, from Vancouver.

Now, within this Copper/Bering system, I'd like to step to the map and point out one thing. OK. When birds—using these two examples, western sandpipers and dunlands—do migrate from Vancouver, which is going to be somewhere down here or lower on your map, and they reach this whole system, the very first stopping point appears to be the Controller Bay area, the flats of Controller Bay. Not all birds make their first hit there, but many of them do. And then once the're in this system, I call it the Copper/Bering system, they start moving westward across the whole system, perhaps hopping along the way, some maybe going all the way to the other end. Now, if you look at the distribution of invertebrate food resources which they're feeding on, the central part of the Copper Delta is a pretty sterile place. There's a lot of ice scour, a lot of silt, all kinds of things, and it doesn't appear to be a very prime feeding area for shore birds, so the next important habitat within the system starts over here at Allegheny Slough, Tedamen Slough and along the insides of some of the barrier islands, particularly Egg Island, and so that what we have, in essence, is that the two extremes of this stretch are the most important ones for birds such as shore birds.

This isn't directly applicable to waterfowl and again, though, from what Mr. Leedy was saying, we're speaking here of 20 million—at least 20 million shore birds, and half of them are western sandpipers and dunlands, and to put that into further perspective that's the entire world population of western sandpipers, so far as we know, and an entire population of one subspecies of the dunland. Now, there are two other shore bird species which one can identify are sort of in a similar boat, that they're making long, overwater flights, they're hitting the Copper Delta, having to move on, and these are the surf birds and the red knot, and in both cases—in the case of the surf bird, it's probably that significant fractions of an entire world population are using the area. In the case of the red knot, it's again significant fractions of an Alaskan population. Now, to move out the other side of the system, for western sandpipers and dunlands, their next—they're ending up in places like the Yukon Delta as their breeding ground, so they have another flight of another 1,000 kilometers or more after they leave this system, and the biological evidence for dunlands, which is the strongest at this point, is that they're using the Copper Delta system as an opportunity to replenish fat reserves, which fat is simply the fuel that they use for migration. They reach the Copper Delta, their fat reserves are depleted. They feed in it. By the time they leave, female dunlands—in 1976, I'm the biologist that did the work—took a 16-percent weight gain across the system and that's attributed to fat deposition.

So I think that gives some perspective on the importance of the area to shore birds. It's true perhaps to a lesser extent or in slightly different ways for some of the waterfowl species, we suspect, and I might point out that the Copper Delta is the focal point for birds that are coming from many parts of the world and so these westerns and dunlands that birdwatchers are looking at in California are all tunneling through the Copper Delta. One more bird species which hasn't been mentioned and maybe Mr. Leedy can do it better than I, or someone from the Forest Service, the peregrine falcons are migrating through the area. I believe there may be a couple of resident birds breeding also at at least one place that I know of, so there is that wildlife resource which has not yet been mentioned.

Finally, we did hear something about sea bird colonies, but particularly those at the Martin Islands by Katalla are accessible to people who want to view sea bird colonies. You can land on the beach at Katalla very easily, with binoculars you can see the kittiwake colonies, which are something many people like to do and many sea bird colonies are quite inaccessible to most people. OK.

Mr. HARVEY. Thank you very much. Yes?

Mr. McCURDY. Mike McCurdy, Department of Fish and Game. I'd like to just comment—I have a few comments on that area previously described by the Forest Service biologist. The whole area has been uplifted some 6 feet in the western edge by Eyak Lake and probably down around closer to 4 feet by the time you get over to the Bering River. This area supports populations, a number of populations of sockeye salmon and coho salmon, which contribute to the commercial fishery of the area and the coho being a contributor to the sports fishery also. Since the 1964 earthquake, the population of coho salmon have been drastically reduced, in that we believe that the fertility of the flats out there has been reduced because of a lack of intrusion of salt water from the high tides. Consequently, the coho rearing areas, the productivity has been lowered. The Department right now isn't real active out in that particular area, because of the small populations involved and—but we do have some future proposals that we're going to be bringing up through cooperative agreements with the Forest Service and the private nonprofit aquaculture corporations. One of these would be to create rearing ponds out in the flats in strategic areas, of which they are yet to be located.

One other problem we have with the—related to the commercial fisheries activities is the Bering River, the Bering Lake, I should say, in that it's slowly—the lake—the river is slowly eroding back down to the level prior—that existed prior to the earthquake. We've had an area management biologist out there for nearly 20 years now and he says every time he flies that he's starting to see new rocks appearing on the lakeshore and so on and so forth. What we'd like to do, again, this is another proposal, is to install a weir in there of some sort to maintain what we have now and possibly raise the lake a number of feet to maintain the rearing area for Bering—for the Bering River sockeye and coho. We've already done this in the Eyak Lake. We've raised that lake back up some 6 feet. We're in the process of losing a lot of the shore spawning gravels for spring for sockeye and coho salmon. We have, in the past, operated weirs on the Martin and Tokun River systems for sockeye escapement enumeration. That's just about it, other than stressing again that our fisheries rehabilitation enhancement and development division in the Department is working in cooperation with the Forest Service on these areas.

Mr. HARVEY. Thank you. Yes?

Mr. SOMERVILLE. Yes. Ron Somerville with the Department of Fish and Game. I can't add too much specifics. Mr. Leedy and others have already covered most of the species. Just a couple of key points that might help on fish and wildlife aspects. One, I think I should also point out that the Copper River Delta isn't just an island in itself. If you look on down to the Yakataga Forelands, you'll find in smaller details much of the same type of habitat you have here. Not necessarily as good of a quality or quantity. For instance, I think sandpipers and many of the other species previously mentioned have also been documented as being in that particular area and I just—I mean, that whole forelands is extremely important and I wanted to point that out. Also we have a number of big game species that move across the Copper River, bear, moose, for instance, although the two populations at Martin River and on the west side of the Copper River, moose populations, seem to be relatively stable. I recall that there is some exchange, but not as much as you might expect. Also moose populations continue on down the Yakataga Forelands to some respect.

I'd also like to point out, there is good fur bearer populations. The commercial trapping is quite popular in this area, and I guess to illustrate this thing of the numbers game, I guess, like I said, you don't entirely trust a computer type system. But people have used the thing, well, this may represent only 1 percent of the State's total harvest of, say, moose. You could say the same thing about Copper River. Less than 1 percent of the total statewide moose population is harvested in this particular area, yet it's 100 percent of what these people in Cordova utilize.

Mr. SENNER. I have—Stan Senner, Alaska Coalition. For the record, a document called Resources Use and Management of the Copper River Delta and this was prepared for the Leggett subcommittee by the U.S. Fish and Wildlife Service. I have a document, one for the record and one for whichever of you wants some bedtime reading.

Mr. McCURDY. Mr. Chairman, Mike McCurdy of the Department of Fish and Game. I did neglect to mention one other bunch of fish and that's that we also—the area also supports unanimous races of dolly varden and resident races of dolly varden, plus there's cutthroat, rainbow and grayling also present in there that support a limited sport fishery, mainly for the local residents.

Mr. HARVEY. OK. Yes?

Mr. WICKES. Mr. Chairman, Jim Wickes, Department of Natural Resources. According to statewide assessment on wildlife habitat, roughly almost 40 percent of the area within the Udall proposal falls in the top 10 percent of the whole State, so this is generally corrobated as a high biological productivity and we have testimony to that effect that we could give forth.

Mr. HARVEY. OK.

Mr. McCURDY. Again, Mike McCurdy, Department of Fish and Game. This biological productivity has definitely been lowered, from our observations, since the 1964 earthquake. It has done—such animals as moose and bear probably fare a little bit better, especially the herbivores, however, fishwise, we've been hurting and knowing the people out there in Cordova, they say the duck hunting isn't as good as it used to be.

Mr. HARVEY. The hunting is never as good as it used to be.

Mr. LEEDY. Bob Leedy, Fish and Wildlife. One of the problems they've been having with ducks lately has not been because of declining populations, but the ducks are feeding further out on the flats and more inaccessible areas.

Mr. MCCURDY. Yes. They're passing through the area quicker. They aren't holding over as much.

Mr. HARVEY. Any more comments on the wildlife values? All right. Let's talk about the renewable resources, then, that is significant here, timber and agricultural potential, forests. Yes?

Renewable Resources

Mr. HARNISH. Yes. Charles Harnish of the U.S. Forest Service. I'd like to mention that on the delta, itself, this isn't—this is just within national forest land existing, there's 328,000 acres of commercial forest land as inventoried and then that contains about 3.4 billion board feet of timber, all species, all ages of timber. That would be just within the national forest boundaries.

Mr. HARVEY. Yes?

Mr. WICKES. Jim Wickes, Department of Natural Resources. Within a broader area, also within the Forest Service areas and extending east to the Udall boundaries essentially, we find that roughly 50 percent of the area has some commercial forest value and it rates in the fourth level on a scale of 10. One being high.

Mr. HARVEY. Anything on agriculture? Yes, sir? Anything else on the renewable? Let's get into the discussion of non-Federal lands, State and Native selections.

State and Native Land Selections

Mr. WICKES. All right. Perhaps Carl will want to make a few more points on this. With respect to the State land within the Udall unit again, there are roughly 300,000 acres and it's largely to the east of the Katalla and Bearing River area. According to our information, Native selections in place within the Udall boundaries come to something around 220,000 acres. The State has no selection interest areas in this general vicinity, with the possible exception of some national forest selections made under appropriate sections.

Mr. HARVEY. Community purposes grants, right?

Mr. WICKES. Right.

Mr. PROPST. I'm Carl Propst with the Chugach Natives. I must not be completely familiar with the Udall boundaries, but within the general delta area, the only Native selections that I know of are by the Village Corporation of Eyak and they only extend out to mile 17 or 18 or so of the Copper River Highway, not really into the delta. Regional corporation selections pick up in the Carbon Mountain, Bering Glacier area, and then through the Robinson Mountains, but don't really extend into the delta area.

Mr. Wickes. Yes; just a point of clarification. The Udall boundaries do cover a lot of the Native selections to the east.

Mr. Propst. Oh, and something else I just recalled is that the Controller Bay area, which has historically been outside of the national forest, roughly 10,000 or 12,000 acres, I think, has been selected by Chugach Natives. There are also some other private inholdings there. And then there are a number of cemetery and mostly historical site selections around, oh, Katalla and Chilkat, and then a probably disputable 14H–8 land selection around the township in which Katalla is located.

Mr. Harvey. Anything more on this? All right. Let's go on to the energy values. Before that, the Forest Service representative, could you give us—not now, but just for the record, the annual allowable cut figures for the Chugach? Energy resource values in the area.

Energy Resources

Mr. Sisson. Alex Sisson, with the Alaska Oil & Gas Association. I'm going to just—The area I'm going to talk about, and maybe I can get this all done in one swoop, is the area from Yakutat to the Copper River Delta. Is that all right with you?

Mr. Harvey. Yes. Yes.

Mr. Sisson. I just noticed you've sort of been jumping around and I've been a little bit confused, myself. This is a U.S.G.S. compilation of the Gulf of Alaska Tertiary Basin, put out by the—George Plafker of the U.S.G.S. and other workers. It delineates the Gulf of Alaska or the northern Gulf of Alaska Tertiary Basin, and the sedimentary basin is along this line right here. South of here is what they call the Tertiary Basin. It has been somewhat described this afternoon and I will not go into it and explain the geology. The Gulf of Alaska Tertiary Basin, on shore, is a potential oil and gas province. It has sedimentary sediments, it has sediments that range in age from Eocene through Pleistocene, of a total thickness of at least 20,000 to 25,000 feet. It has oil and gas seeps. There have been wells drilled in it in which there have been oil and gas shows. This map will—And we will submit maps that will show you the wells and so forth that have been drilled and where the seeps are and so forth. It also has structures in it, structures that are expressed on the surface, that are drillable structures for oil and gas.

There, as you know, has been a tremendous amount of activity moneywise, timewise, offshore in this OCS area and this area here. To date, nine wells have been drilled and unfortunately, no oil has been found, at a tremendous expense to private industry. The area to the west, the Copper River area. The area that I have outlined here is the Copper River Delta extension, I guess, or whatever you want to call it, that is proposed for the—for a reserve. The oil industry foresees no problem in this area. We don't believe that the area has a real potential for oil or gas. However, we have not done any drilling in this area and we would like to have the opportunity to go into this area to do some what we call recent geological studies of these types of sandstone that—recent deposits, to relate this as an analogous situation to older geological formations. The area that we do have a problem is the back side or the west side of Ragged Mountain and this area in here. Here, there are gas seeps and there is—there are outcrops that need to be studied for projections offshore.

Going west, here is Cape Suckling and going—I mean, going east, here's Cape Suckling. East to Icy Bay. This big red line, by the way, is the northern extension of the Gulf of Alaska Tertiary Province. There are areas of conflict. This area in here between the red lines—between the blue lines which many people can see, you people there can't see, is an area of conflict. We would like to go in there to study the rocks by permit. It probably does not have very much oil and gas potential, because in the Robinson Mountains—not because, but in the Robinson Mountains and south, yes, it does. But up in this area, no, but we do want to get up in that area. OK.

Farther east, in the Malaspina area, this has a possible potential for oil and gas. We don't know. But again, this was mentioned on last Monday, we would also like to have the opportunity to do some core drilling or drilling in this area, perhaps in the future. I think that covers it. There's a small conflict area here. This blue line is a south extension of the south part of the Wrangells. There is a place in here in the Samovar Hills and so forth, that are out of the area, that a field geologist could do some geology if it goes into the park system. I think that covers it pretty well.

Mr. PITTMAN. Tom Pittman, Bureau of Mines. I wish to point out the eastern Gulf of Alaska Tertiary Basin has the potential for possible sedimentary type uranium deposits. On the map there is a line along the coast with half black diamonds, which is an ATC designation. I believe that probably is referenced, but you may be able to follow up with more information.

Mr. HARVEY. Yes?

Mr. WICKES. Jim Wickes, Department of Natural Resources. The extent to which that basin that was just described is overlain by the Udall proposal for that area. I can give you a quick specific on it. Roughly 800,000 acres are—of that basin, which ranks in the top 40 percent in the State, falls within the Udall proposal. In terms of coal, I have the figures. Roughly 172,000 acres rank in the fourth level on a statewide basis and are found in the Udall proposal.

Mr. HARVEY. Anything else on the energy values?

Mr. SENNER. Just a question. How much of that sedimentary basin on uranium is outside of the Udall proposal? You said 800,000 is in. What's outside?

Mr. WICKES. I'm sorry. I was referring to oil and gas.

Mr. SENNER. Oh, I thought you mentioned uranium, OK.

Mr. HARVEY. Yes?

Mr. GORDON. Just a request. if it's—If your people can gather the same sort of an analysis for the struggling subcommittee, principle Cooper Delta wilderness study area, is that essentially the Udall proposal less the State lands east of the Bering River?

Mr. WICKES. We have that potential, yes.

Mr. GORDON. Could you do that?

Mr. WICKES. Sure.

Mr. HARVEY. Any more comments on the energy potentials in this area? All right. Let's go to the hard rock potentials. Chuck?

Nonfuel Mineral Resources

Mr. BANNISTER. We did not address the Copper River Delta during our field studies, the Orca volcanics in this general area and these other tertiary volcanics along the north of this map. Mr. Renshaw worked in that area and the Wrangell-St. Elias area. This is possibly the same type of——

Mr. HARVEY. I think—yes, he covered this entire area before.

Mr. BANNISTER. Well, I'm not talking about the coal now. I'm talking about the hard rock potential.

Mr. HARVEY. I understand, but I mean, he did cover the whole area for his purposes.

Mr. BANNISTER. OK. In terms of the hard rock minerals, this area has possibly the same type of rocks as those in which—the copper deposits of LaTouche Island occur. Our investigations this summer were very inadequate in this area, because of difficulty of access with a small helicopter what samples we did take were all anomalous in copper.

Mr. HARVEY. Anything else on the hard rock mineral value there? All right. Go ahead.

Mr. PITTMAN. For the record, one small gold occurrence in the McKinley Lakes area, east of Cordova about three quarters of the way to the Copper River and north of the highway. It has had some exploration but as far as I know, no production, and is rather unknown for potential.

Mr. BANNISTER. For the record, I probably forgot to mention, there's a summary report being compiled on this area, which will be available possibly in 2 months. The final detailed report will require more like a year.

Mr. HARVEY. OK. Transportation and access issues, Does anyone have any comments on that in this paricular area? Yes?

Transportation and Access

Mr. REFFALT. Bill Reffalt, Fish and Wildlife Service. I have been informed by some of the people in my area office that there have been an increasing number of conflicts developing on the Copper River Delta Area, with regard to airplane landings in areas such as the major sandhill crane staging area, and in certain areas, some potential conflicts between airboat operation in the delta and some of these staging grounds, such that it looks increasingly more as though, that, regardless of which agency is involved, there is the possibility of need for some regulation of these aircraft and other air- or machine-type access to that area. It does perhaps need to be limited somewhat.

Mr. SENNER. Stan Senner, Alaska Coalition. Just to amplify one thing Mr. Refalt said. The specific problem on the east side of the Copper Delta is that charter pilots drop hunters and then haze the cranes at low level flying, just to raise them up so that more hunters can get opportunity. I've seen it, myself, several times.

Mr. HARVEY. Any other comments? Go ahead.

Mr. SOMERVILLE. Yes; one sidenote. Ron Somerville, Fish and Game. Part of the problem he's mentioning can be attributed to the Fish and Wildlife Service, Forest Service, and Fish and Game, because they round up those fightless birds every time, those dusties, and put bands on them so they can shoot them down in that Willamette Valley area.

Mr. HARVEY. We'll have to look into that.

Mr. EDDER. My name is Robert Edder. I'm the regional design engineer for the Department of Transportation. I have to make a comment on that last one. I've hunted on Cottonwood Point, where the sandhill cranes land, and the only way you can fly in there is in a float plane. I've never seen an airboat get down to that area. The Copper River is a braided stream and you may be able to get down there in high water in July, but the hunting season doesn't start till September and you can't get there in an airboat in September, to Cottonwood Point. In my 16 years of hunting down there, I've never seen a plane chasing the sandhill cranes up, but the—and generally when we hunt there, I've never seen more than another set of hunters in this entire area where we hunt. It's expensive to get into and not frequently used, but it is an excellent hunting area. I, personally, would hate to see it go into a refuge system, where you could not use it for hunting. Its marshes must be 40 miles long and 6 miles wide.

Mr. HARVEY. I gather from your comment that you would want to see it remain open to hunting? My point being that there is hunting in a lot refuges. Hunting is permitted in some of them.

Mr. EDDER. Yes; I came from Wisconsin, where you could hunt one time at Horcon Marsh Refuge and you can't really hunt there anymore.

Mr. HARVEY. Well, I'm not arguing about that. I didn't say they all do.

Mr. EDDER. I think seriously——

Mr. HARVEY. The point is, you want to keep it open to hunting?

Mr. EDDER. I think so, myself.

Mr. HARVEY. All right.

Mr. EDDER. In reference to transportation, at one time we had a corridor laid out from the Forest Service boundary at mile 39, down toward Katalla, in the advent that either coal production or oil production would begin down there. We did have a corridor, we do have it surveyed and it was surveyed back in 1958, so you may consider from the standpoint of energy or coal, that you may want to retain that corridor if you go into a wildlife refuge.

Mr. HARVEY. Yes?

Mr. BEAL. Clay Beal with the Forest Service. I might just mention that we have zoned the eastern edge, say, from the Copper River—well, the entire Copper River delta, but not the Bering River country, for offroad vehicle use and we have prohibited there use of airboats and any other type of offroad vehicle used during the nesting season and also in part during the hunting season. One other point on identified access, some of the oil companies have identified areas within this Copper River as potential onshore facility development for Outer Continental Shelf drilling. Another thing that's within the area is the Cordova Airport.

Mr. HARVEY. Yes?

Mr. EDDER. Robert Edder again, Department of Transportation. To add to Mr. Beal's comments there, most of this area, as I think you know, is in the game management area and it's managed, I think, jointly by the Forest Service and by the Alaska Department of Fish and Game. From my observation of it in the last 16 years, they're doing an outstanding job of managing the moose herds and the duck and goose populations. They regulate the seasons, particularly on moose. They allow a certain number to be harvested. They've got maybe the healthiest moose herd in the State of Alaska in that small isolated area, and I think it's because of the way they're managing it. They're also doing an excellent job on the duck and goose hunting. They regulate that. They have restricted, like Mr. Beal said, the use of airboats and off-road vehicles in the primary nesting and hunting areas.

Mr. HARVEY. Thank you. Would I be correct, just for the record, that the views you've expressed about the wildlife management are yours and not those of the Department of Transportation?

Mr. EDDER. That's correct. Those are my own personal views.

Mr. HARVEY. Right.

Mr. EDDER. From 16 years of observation.

Mr. HARVEY. No, I just wanted to make it clear, but that's fine.

Mr. SENNER. To what extent is there oil and gas leases—or are there leases in the delta, itself. Are there any existing?

Mr. BEAL. Not to my knowledge. Maybe Jules of BLM has got a better idea than I do.

Mr. TILESTON. I'd have to provide it for the record. I don't know.

Mr. HARVEY. Are there any other comments? Go ahead.

Mr. PROPST. I can respond partially to that. There are existing leases. I don't know how many or over what extent of an area, but certainly in the Controller Bay area and definitely on Kayak Island, there are some.

Mr. BEAL. There's also private land down in the Katalla area, with patented mining claims.

Mr. HARVEY. Any other comments on this? We were going to try to pick up a couple of the wild rivers, but the tape change loses another 10 or 15 minutes here. I think it would be best to just pick up tomorrow with hitting those wild and scenic rivers first.

Then going up to the Forty Mile area, and then we'll pick up on the Arctic game range in the south—the Northeastern Alaska area. We'll adjourn until 9 o'clock tomorrow morning.

ALASKA NATIONAL INTEREST LANDS WORKSHOPS

FRIDAY, FEBRUARY 17, 1978

ANCHORAGE, ALASKA

TAZLINA, GULKANA, DELTA, AND SUSITNA

Scenic, Landscape, Historic, and Archeological Values

Mr. HARVEY. The workshop will come to order. We are starting this morning with a brief discussion of some wild river proposals, either study rivers or actual units of the system in areas that fall outside some of the general proposals and then we'll be moving up into the northeastern areas, including the Yukon Flats and this afternoon, the additions to the Arctic game range. At various points, people have indicated that they will be submitting materials for the record. If you want to be sure that those materials, if they're suitable for printing in the official committee print that will be the product of this workshop, they will have to be submitted no later than March 3. We will obviously take materials and be able to use them at any time, but if they come in after March 3, you can't be sure that they'll be in the printed version of this workshop. I'm going to ask Dick Stenmark now to go ahead and briefly describe the areas we're talking about.

Mr. STENMARK. Richard Stenmark, Land Use Planning Commission. There are four or five rivers within this region that we want to address. These rivers lie outside of some of the larger (d)(2) Proposal areas. They would be the Tazlina, Nelchina, and I'll go into a little more detail on each of these as we get to them. The Gulkana, here in the center of the Copper River Basin. The Delta River, the Susitna and then we'll move up to the Forty Mile system. We'll start out, then, with the Tazlina, Nelchina River here, and basically then consider the area from the Nelchina Glacier and the river then running from there down to Tazlina Lake and the outlet of the lake on over to the Copper River confluence.

Mr. HARVEY. We can proceed to the comments on the Tazlina River. Do you want to start, Dave?

Mr. DAPKUS. Dave Dapkus, Heritage Conservation, and Recreation Service. Instead of the Tazlina, I'd like to talk about three other rivers that we've studied, the Delta, the Gulkana, and the Forty Mile. The Delta, I'd like to talk about the uniqueness of that. It's kind of a mixture of its values, and the first, I think, primary and most important thing is its road accessibility. The Delta is probably the most heavily used river in Alaska by Alaskans and by outsiders that come in, because it's on the highway system. The part that's used is rather short. Its access is in Tangle Lakes, off the Denali Highway and then down on the Richardson Highway at either Mile 212 or at Black Rapids Glacier. It's got three major values.

One is its scenery. It starts out with alpine tundra, open plateau country, and goes into a very restricted canyon and then in the heart of the Alaskan Range and then comes out into a little wider valley as it goes down. It's a very good boating river, very popular. It's got good grayling fishing. It's got class 1 to class 4 white water, and the other thing that makes it unique is that the upper part of the Delta is a clear water stream and starting at Eureka Creek. About 12 miles downstream, it becomes a glacial river and changes its character quite a bit. The lower 15 miles just above Black Rapids Glacier is all class 4 white water and for the experienced. One other value of it is its archeology and its Native history. The Tangle Lakes archeological history encompasses the whole lakes system, which is about 16 miles long and the upper part of the river. The Delta flows north into the Tanana and on down the Yukon and so forth.

The Gulkana comes very close to the Delta, only it flows south into the Copper. The Gulkana is also really accessible at Paxton Lake, at Sourdough, and down at the head of the Gulkana. It is also very popular. It's an excellent float. Little quieter water, but it's mostly class 1 and some class and one little short rapid of class 4. It's an excellent, as is the Delta, family float and its other value is good fishing. It's the leading red and king salmon spawning grounds of the Copper River system and extemely popular. There's some commercial guiding there, most of which starts at Sourdough, which is halfway down the river, and they come upstream by riverboat.

Now, I'll pop up to the Forty Mile, which is an international river. It's also very accessible in many areas. It goes down into the Yukon in Canada and is real accessible, because you can get out there and you can float down to Circle and to Eagle first and to Circle, if you want to make a real long trip out of it. It has two big values, one is recreation. It has a variety of water from class 1 to class 4. It is also highly used, although not quite as accessible as the Delta and the Gulkana. It's good for all types of boats, rafts, kayaks, and canoes. There's good hunting, with some good fishing there.

Its second value, which we'll get into later I'm sure, is its mining history and, of course, there's mining now. Starting in 1886 through 1942, there's been an estimated $8.7 million worth of gold taken out of the Forty Mile District, which circles the Forty Mile River. Talking just of its history, when one floats the Forty Mile or any of its forks, you can see a lot of the remnants of the early mining history, the old cabins and the various things that the men had there to mine with are present. Thank you.

Mr. HARVEY. Are there any comments on the Tazlina area, in any category? Go ahead.

Mr. HESSION. Jack Hession, Alaska Coalition. Just briefly, the Nelchina/Tazlina system is one of the glacial streams I spoke of yesterday, predominantly glacial streams. It's a component of the overall Copper River lake/stream system, a sockeye stream in part. Its features include road accessibility at both ends, including the Little Nelchina. But although it parallels the Glenn Highway quite closely, you get the feeling of a wilderness experience. It's—two rivers, to explain, the Nelchina flows into Tazlina Lake and the Tazlina, of course, flows on down to the Copper. The two rivers are different, substantially different. The Nelchina cutting down through high bluffs, is a very geologically active river which by the way are not common in Alaska, at least in my experience. You see permafrost lenses exposed and active gravel falls on these high bluffs. It's quite interesting to see the river work its way down through the deposits. The Tazlina River, because it has its source in a large glacial lake, is somewhat clear. It's a milky stream and it accounts for the sockeye run up to that lake. It is a little bit more interesting from a white water standpoint, although both are challenging canoe, kayak and raft rivers. The lower Tazlina has a superb view of the Wrangell Mountains and it's possible to continue on down. I should mention that because of the salmon run, you get wildlife oriented recreation, brown, grizzly bear, bald eagles, and scavengers. Thank you.

Mr. HARVEY. Thank you, Jack. Any other comments on the Tazlina? Yes?

Mr. MCKEEVER. John McKeever, Alaska Oil and Gas Association. The Tazlina system runs through the southern portion of the Copper River Basin which, as I pointed out yesterday, is an area of considerable oil and gas potential. The withdrawal of these streams as wild or scenic rivers would substantially inhibit access across the streams. For instance, to the south side of the river is an area which is worthy of considerable exploration as it has some oil and gas potential.

Mr. HARVEY. OK. Any other comments? All right. Let's continue on.

Mr. STENMARK. I'm surprised that there aren't more comments.

Mr. HESSION. Are you taking mineral comments now?

Mr. HARVEY. Yes.

Mr. HESSION. Are we still talking about all the rivers in that area that Mr. Stenmark mentioned?

Mr. HARVEY. Right.

Mr. HESSION. All the study rivers or wild rivers?

Mr. HARVEY. We're going to try to pick them all up. It's my intention to do one at a time. I know Dave did three or four of them at once. I'd like to just get all the comments in any area, whether it's minerals or timber or whatever you—whatever anybody wants to say about a particular one. Let's just go on to the next one.

Mr. MENZIE. OK.

Mr. HARVEY. All right.

Mr. STENMARK. I gather there are no more comments on the Tazlina? Does the State have any comments on the Tazlina, relative to land ownership or anything of this nature?

Mr. WICKES. Jim Wickes, Department of Natural Resources. In terms of overall access, the present State administration policy is one of working with the Congress to establish a mechanism whereby access problems in the future, as they come up, can be handled and not necessarily to identify now any corridors, per se. So the access issue, with most of the wild and scenic rivers I think we'll be talking about, as well as the other (d)(2) areas, I think are of some concern to the State. The present administration prefers to establish mechanisms instead of trying to guess where the best corridors are at this point in time.

Mr. HARVEY. Thank you. I think Jim's comment is valid, that there is a major problem. The gentleman from AOGA brought it up. There is not a specific problem, but it's a situation that may cause an access problem at some future point. Go ahead.

Mr. SOMERVILLE. Yes. Ron Somerville with the Department of Fish and Game. This is why we hadn't raised the point here. As we have already mentioned previously on the wild and scenic rivers most of them have anadromous fish. Almost every one of the study or the indicated wild rivers have anadromous sport fisheries and we may have some problems relative to either research, administrative sites or trespass or mechanized trespass. There could be a problem with almost any of them.

Mr. HARVEY. Thank you.

Mr. STENMARK. The next river, then, we'd like to spend a little more time on would be the Gulkana River.

Mr. MCKEEVER. Yes. John McKeever, Alaska Oil and Gas Association. I'll say again that the Gulkana River and its forks, the west and middle fork, also go right across almost the center of the Copper River Basin, which presents severe problems for the movement of heavy equipment from one side of the river to the other.

Mr. HARVEY. Any other comments on the Gulkana? Yes, Jules?

Mr. TILESTON. Jules Tileston, BLM. The Gulkana, right now, is receiving extremely heavy use. There are conflicts beginning to develop between the various types of recreational use. This is being worked on in close cooperation with——

Mr. HARVEY. Can you be more specific? Such as?

Mr. TILESTON. Well, such as boaters in specific, and king salmon fishermen. That's the classic thing that you run into in the east now, in the New York rivers. In other words, it's a conflict of use of the rivers, relatively small, in that you've got 50 yards of line out playing the king salmon, and somebody comes through with a canoe. You've got some problems. We're into that situation now because of its road accessibility.

The other thing is that the river, itself, is in two major land classifications. One, it is in the pipeline corridor. The studies were done several years ago and they were deferred in terms of proceeding on to any definitive conclusions until the gas pipeline routing had been concluded. As a result, much of the legwork, including some public meetings, has been done on the river. Those are now being reactivated. The villages and, I believe, some of the regions will have the lower end of the river. They have selected and that will be transferred. The upper end of the river, particularly the west fork, is in deficiency and is in some degree of uncertainty as to whether it will or will not be selected.

Mr. HARVEY. Thank you, Jules. Any other comments on the Gulkana?

Mr. STENMARK. All right. Let's go to the Delta River, then.

Mr. HARVEY. Any comments on the Delta? Yes? The gentleman in the back there.

Mr. ROGUSKI. Gene Roguski, Department of Fish and Game. I'd like to speak a little bit about the upper end of the watershed, the

Tangle Lakes area. The Department of Fish and Game, for many years, has studied both the angler use and the fishery of the Tangle Lakes area and we have managed the area in some respects. It's a highly used area by sport fishermen, as has been previously mentioned. Many thousands of days of angling every year.

There's principally about three types of fishermen. People just utilizing the campground. Fishing isn't all that good, because there are a large number of them in a short, small area, and if people with watercraft, canoes or small boats, rafts, can get away 1 mile or 2, fishing is usually excellent, especially for grayling and lake trout, and there is, of course, a large number of canoeists and other floaters who go down the river. We have, over the years, noticed no real problem with fishing success, other than right around the camp area. Fish are generally of large size and plentiful. A person can hook and release many in a day without any problem. Several years back, the daily bag limit on grayling on all waters in the Tanana drainage, we reduced that from 10 to 5 fish a day and we, of course, see no problem with them being able to manage this fishery at the present usage.

Mr. HARVEY. Thank you. Any other comments on the Delta area? Jack?

Mr. HESSION. I just have one, Mr. Chairman. My analysis of the State land—State interest lands in that area shows six townships of high interest or high priority State interest. Does that check with yours on that?

Mr. WICKES. Yes. In terms of identifying the larger areas.

Mr. HESSION. Right. I think the river would flow through about six of those townships, in which case it might tend to negate the wild river proposal. I was wondering what you desire those townships for?

Mr. WICKES. Do you know what numbers they are?

Mr. HESSION. Pardon?

Mr. WICKES. Do you know what numbers?

Mr. HESSION. I don't have it here.

Mr. WICKES. I guess you're referring to the Denali area.

Mr. HESSION. Yes.

Mr. WICKES. There's a block of them there. In terms of our primary interest, for the record, this is area No. 38 in the State's selection interest areas, in case you want to refer to a map later. Our primary interest there is from recreation potential in the Tangle Lakes area, and in respect to a wild and scenic river emanating from those lakes and flowing northward. We see the possibility of there being some complementation in those designations.

Mr. HESSION. Thank you.

Mr. WICKES. So we don't see any particular conflict there.

Mr. HARVEY. Any further comments? Yes, Jules?

Mr. TILESTON. The lower part of the river also is in the pipeline corridor. There are significant blocks of mining claims that have been filed in the lower river area. There is no active mining. There has not been a validity check, as such, but presumably they could be valid and I really don't know in this context, but there are a substantial block of mining claims. They are being maintained in terms of good posting, marking, et cetera. There is no conflict with either the Delta or the Gulkana in terms of wild and scenic river designations and the continued operation, repair, and maintenance of the pipeline. These things went into consideration in the location of materials sites. Crossings and this sort of thing all were taken into account along with the longstanding existing recreational uses of these areas.

Mr. HARVEY. Thank you. Yes?

Mr. STENMARK. A point of clarification. Can somebody tell me what the northernmost point on the Delta River is, as proposed in any of the proposals?

Mr. DAPKUS. Dave Dapkus, Heritage Conservation and Recreation Service. I think it's Black Rapids Glacier.

Mr. STENMARK. Well, I'd like to point out that looking at the administration's 1-to-250,000 scale maps, it shows the terminus running on northward to Delta Junction or near there. This roughly shows about twice as much river than is actually proposed.

Mr. HESSION. Jack Hession, Alaska Coalition. The coalition disagrees with BOR on the northern terminus. We propose a point roughly a quarter of a mile north of Black Rapids Glacier, where you can take out right alongside the Richardson Highway.

Mr. STENMARK. But certainly not on up to Delta Junction?

Mr. HESSION. No.

Mr. HARVEY. Yes? Thank you, Dick. Yes, sir?

Mr. BLAKESTED. My name is Rod Blakested. I'm with the Alaska Miner's Association. I'd like to put in for the record some mineralization that I'm aware of and I have worked on in the Delta River area. None of the mineralization which I'm going to speak about actually is found on the banks of the river, itself, but they are found within a few miles. I will try and lay out the specifics as close as I can, with the rather crude map that I have in front of me. I was not prepared to talk on the wild and scenic rivers today, but township 18 south, range 3 west of the Fairbanks meridian, contains a great deal or a great potential of having volcanogenic hosted massive sulfide mineralization of a copper nature and with possible lead zinc mineralization as well.

Township 18 south, 2 west has a great deal of potential for nickel, chromium, copper, silver, and gold. Township 19 south, range 1 west has a zone of volcanic type mineralization, volcanogenic mineralization that is very rich in copper. My personal knowledge of this particular prospect is that it traverses across the countryside for about 7 miles. I have, personally, collected samples from this zone. It is up to 1,000 feet wide and runs 7 to 12 percent copper locally. Of course, that's of fairly high grade samples, high grade specimens, but it is a fairly major mineralized zone that has a great deal of potential and it is within the southern tier of the Delta wild river withdrawal area.

Township 20 south, range 1 east has disseminated copper mineralization and vein-type gold mineralization, plus one small placer gold occurrence that was probably not economic at the time that the miners were working there, which was back in about 1914.

Township 21 south, range 1 east has some potential for disseminated copper mineralization and also vein type gold mineralization and there are tertiary volcanoes and lignitized coal bearing tertiary sedimentary units there which possess some potential for uranium mineralization. I'd also like to point out that in the Tangle Lakes area, the Amphitheater Mountains in that vicinity there, which again is not directly affected, say, within a mile of the actual Delta wild river proposal. But that vicinity is a zone of what we call mathic volcanic rocks, which possesses a fairly high potential for again copper and/or silver mineralization associated with those rocks. Again, I'd like to state that these zones of mineralization are—do not crop out on the riverbanks, themselves, but they are in the drainages and any attempt to develop this—these mineralized zones may have an effect on the drainage system and I would just like to put this into the record for that reason.

Mr. HARVEY. Thank you very much.

Mr. KLINE. Mr. Chairman, Bob Kline with the State. The area No. 38 of State selection interest overall one of the major reasons it was selected was for high hard mineral potential, but not necessarily down in the particular river that you're talking about, but the general area does have high potential for hard mineral development. Thank you.

Mr. HARVEY. Jules, to the extent these lands are in the pipeline corridor, they're not subject to the mining claim location now, are they?

Mr. TILESTON. No. Mining location now is not.

Mr. HARVEY. Are there any further comments on the Delta?

Mr. TILESTON. Mr. Chairman? Jules Tileston, BLM. Before we leave the delta, there is another aspect in several of the pieces of legislation concerning this area and that's that a study for a scenic highway purpose of the Denali Highway, which transects the area that we're just talking about in its upper regions. Some years ago under contract, the Bureau did conduct a contract study outlining recreational potential and things of this nature, including possible interpretation of that area. This will be provided to the committee for its information.

Mr. HARVEY. Thank you very much. Any other comments?

Mr. THOMAS. Bob Thomas, Department of Transportation. I'd like to comment a little more on what Jules just said. We did some survey work up there as far as finding the use of people who drove that highway, and it is essentially what Jules said, people mostly use it for recreation and scenic. Our plans at this time with that road is to not upgrade it in any way, shape, or form, except perhaps to put some kind of surfacing on it. One of our surveys showed that what people really wanted on that highway was to leave it like it is, but put pavement on it, so it wouldn't be so rough. It is very low on our priorities of doing anything to it, for the record.

Mr. HARVEY. Thank you. All right. Let's go to the Susitna.

Mr. STENMARK. On the Susitna River, about where I've got the red line on here. We should probably address the area from the glacier on down through the river, down along the Denali State Park, to at least hurry and if anybody's proposal extends further south than that, it would be helpful to make that point.

Mr. HARVEY. Any comments on the Susitna? Yes, Jack?

Mr. HESSION. Again, here we are talking about a major glacial river. It's one of the largest in the State. It provides the opportunity to traverse the entire Talkeetna Mountains, essentially, bisects the Talkeetna from the alpine zone of the Alaska Range down through to the lower—upper Susitna Valley, in the neighborhood of Talkeetna, Gold Bar and so forth. It certainly is one of the premiere white water rivers of the State, perhaps of the North American Continent, but I'd like to emphasize here that while there's been a lot of attention given to that particular aspect, even if you delected the stupendous rapids in Devil Canyon, you would still have a river that, in my opinion, fully qualifies for wild river status. It's overall class two to four. It provides the opportunity to continue on to the Talkeetna area, via the Talkeetna River, approximately a 5-mile portage and you can continue on to the Talkeetna Mountains without encountering or without being blocked by Devil Canyon. It has good wildlife values. I've seen a portion of the Nelchina caribou herd in there and it provides also the ecological transect from high alpine country down through into cottonwood and boreal forests. Scenically unique in that it's constrained within these high canyons and is set by clear water streams which, in themselves, are of interest.

Mr. HARVEY. Thank you, Jack. Is there anyone—Maybe the State is the one to do it. I recall there was some talk about a hydroelectric site here.

Mr. WICKES. Yes, Mr. Chairman. Jim Wickes, Department of Natural Resources. That would be something that the State would be very interested in pointing out to the committee and staff. The proposed Devil Canyon dam complex, I believe, is located on the wild and scenic river proposal. Also there's considerable Native selected land in the would be reservoir of that dam, so there are Native interests also in the area, as well as State lands further downstream from the Susitna, which should be taken into consideration. I don't know if there's any representative of Cook Inlet here to comment further on that.

Mr. HARVEY. I guess not. Any other comments on the Susitna? Yes?

Mr. MCKEEVER. John McKeever, Alaska Oil and Gas Association. I'd have to say the same thing I said before, that in the extreme northwest corner of the Copper River Basin, the Susitna River cuts across in there where we have again the problem of getting from one side of the river to the other.

Mr. HARVEY. OK. Jules?

Mr. TILESTON. Jules Tileston, BLM. In terms of wild and scenic rivers or river or river running capabilities in Alaska, the Susitna is distinctive. There, I would say, is probably, in terms of difficulty, a technical challenge in terms of mountain climbing sort of challenge, that there's only one other river that exceeds it and that would be the Alsek in Southeast, which you've already discussed. This has been run a few times. It is classed six on the international rating, which means that you take your life in your hands when you run it. Now, this is the canyon, itself. In terms of nationally and taking into account, as I've mentioned previously, the Alsek, that this probably is the one true technically challenging river, exceeding that of the Grand Canyon because of its remoteness, difficulty and everything else, and again I'm addressing specifically the white water challenge. In terms of access to the area, the upper river area is a principle corridor of access for sports hunters downstream from the highway, back up into various drainages and across into the Lake Louise area and vice versa. It is heavily used. It is used by small boats, 19-foot square turned rafts, with motors as well that can navigate this and pull out a fully loaded moose, so the upper stretches do have what Jack was talking about, the two, three, four type classifications.

Mr. HARVEY. Any other comments on the Susitna? Yes?

Mr. BISHOP. Dick Bishop, the Department of Fish and Game. Wildlife habitat has been alluded to in that area and there are various portions of it that are good wildlife habitat, principally for moose and caribou, as well as for bears. There is a fair amount of hunting use in there. I don't have detailed figures with me. We could supply that. It's also an important—the Susitna, in general, is an important commercial fishery stream. There have been studies on both terrestrial wildlife and fisheries, done principally in consideration of the potential hydroelectric development there and if you wish, I'm sure those could be made available.

Mr. HARVEY. Thank you. Yes?

Mr. FANKHAUSER. Bob Fankhauser, Alaska Miner's. I'd like to point out to the committee some of the known mineral potential in that area, of which I have worked on and am aware. South of the river, south of the Susitna and the Portage Creek drainage, this area has been prospected for some time and is referred to as part of the tin/silver belt that continues on along this major fault zone in the Portage Creek area. In addition to that a northeasterly trending zone crosses the Susitna River around Portage Creek area. Going to the east and still south of the road, there are several known occurrences of volcanogenic massive sulfides related to the antacidic and basic rocks in the group that trends northeasterly again, around the Gulkana Lake area and further north, north of the river, in the Sisana Creek area, there are silver/tin occurrences again in a stockwork type situation and there are several known prospects, of which one is of porphyry gold that has been worked on and has considerable potential.

Further north, around Denali, is one of the major occurrences of massive sulfides in volcanogenic and black shale associations. It has been drilled and I don't have the tonnage and figures on that, but that would be just north of the highway around Denali, and there are also several occurrences in the upper Maclaren River. As a general statement, the Alaska Miner's would like to go on record as being very concerned about the access across these wild and scenic rivers. It's very hard to propose a corridor. It's very hard to define or to make specifics, but I think the committee should understand that by drawing a line around a tremendous area in these major stream valleys precludes the only way to get anything in or out or to get into the area. We would certainly wish the committee give some consideraton for valid mineral discoveries which have economic potential of getting these things out.

Mr. HARVEY. You're talking about access, and I assume the oil and gas people are, too?

Mr. FANKHAUSER. Yes.

Mr. HARVEY. For the mechanized equipment that would be necessary for exploration and/or development?

Mr. FANKHAUSER. Most of the occurrences we're talking about are not right in the river drainage and so any development would, be further back up the river. But the problem is, it's absolutely no good to anybody unless you can get it out. There, would be occasions that one would need a right-of-way to get a road or some other means of transportation across the river at a convenient point, and I think, this would be of little disturbance overall. If there are no means to initiate this type of process, it would have a devastating effect. Thank you.

Mr. HARVEY. Any other comments?

Mr. WILLIAMS. Yes. For the State. Did you do a wild and scenic river breakout in your assessment, river by river?

Mr. WICKES. No; we didn't. We had problems getting boundaries. It's easy to define it by 2 miles on either side, but it's a little bit harder to get it down to a map where we can feed it into our system.

Mr. WILLIAMS. So you're not going to do it? I'm not asking you to, but——

Mr. WICKES. We could, but it would require an awful lot of work and we are getting some good boundary information from the people making these proposals.

Mr. KLINE. Bob Kline, from the State. But the resolution you're talking about here is much different that the resolution you're talking about on most of these proposals on our systems.

Mr. HARVEY. Yes; this gentleman.

Mr. HOFFMAN. Barry Hoffman, Alaska Miner's. Thank you. I'd just like to ask the State a question also. On the State lands in this area, what have you classified as the mineral potential or for your State selections, how have you classified the mineral potential in that area?

Mr. WICKES. Are you referring to the Susitna?

Mr. HOFFMAN. The Susitna wild river. There are State lands and State selected lands along further river trends, there are some State selected lands.

Mr. WICKES. Right. The State has yet to really go in there and look in great detail at the mineral values, as well as other resource values. That's further down the road, in terms of a regional plan. We would be able to get the information out from our computer, generally, but we don't have it available right now. We can make that available to you.

Mr. HOFFMAN. Would you put this in the record?

Mr. WICKES. Yes.

Mr. HARVEY. Any other comments on the Susitna? All right. I guess we're ready to go to the Forty Mile at this point. Are there any additional comments? Go ahead.

Mr. MENZIE. The Forty Mile River falls principally with areas Nos. 27 and 28 in our level two study. Area No. 27 is an area of historic gold production, as was pointed out earlier. It also contains rock types which are permissive for the occurrence of felsic volcanogenic massive sulfide deposits, tin gryson, and also tungsten tactite deposits. Area No. 28, only part of which contains the wild rivers, has known occurrences of porphyry copper deposits. We estimate that there's a 90-percent chance that there are five or more porphyry copper deposits in area No. 28 and a 50-percent chance that there are nine or more porphyry copper deposits within all of area No. 28, and a 10-percent chance that there are 13 or more porphyry copper deposits within area No. 28. Area No. 28 also is permissive geologically for the occurrence of copper scarn deposits, felsic volcanogenic deposits, tin gryson deposits, tungsten tactite deposits and it has a small historic production of placer gold. It also could contain scattered polymetallic veins.

Mr. HARVEY. Any other comments?

Mr. BARKER. Jim Barker, Bureau of Mines. Generally speaking, we recognize most of the eastern portions of the Forty Mile drainage as having very high potential for and known occurrences of lead, silver, fluorite, gold, tin and tungsten. There are several hard rock prospects that are being pursued at this time. I think we should recognize the complexity of the withdrawal, in that it blocks off many areas that have known prospects or are believed to have very high potential. Access will be a decisive factor in whether or not any development can take place. In the Forty Mile placer district, which is traversed by much of this river, we conducted a study this past summer and determined that approximately 452,000 ounces of gold have been produced in that district. At this time, there are 50 to 60 people seasonally employed there. We further estimated that approximately 1.4 million ounces of gold could yet be recovered from known placer ground.

Mr. HARVEY. Yes; go ahead.

Mr. QUARLES. This is a general question. I wonder if the Heritage Conservation and Recreation Service has a fairly succinct description of two things? One is the reason for the selections at terminal points on all of these rivers? And second, a description—some of these rivers, of course, have breakdowns of wild, scenic, and recreation. A description, solely for the record, not for right now, but to be included in your breakdown of the reasons for choosing these classifications and, in fact, where the terminals are of each of the classifications.

Mr. DAPKUS. We will do that for you.

Mr. QUARLES. Yes; for all rivers south of the Forty Mile.

Mr. DAPKUS. OK.

Mr. HARVEY. Yes?

Mr. WILLIAMS. I'd like to speak to Dave Williams, Doyon. Native lands in the area, and if I could, I'd like to get up by the map. Dick promised me he'd bring a lot of colored pencils. Roughly, and maybe the State will cover it more precisely, we estimated there's roughly 250,000 acres within the Forty Mile (d)(2) which pretty much is the brown and then the green areas through here. In addition, there was another roughly 145,000 acres that were originally proposed as part of the Forty Mile River, were originally withdrawn for the Forty Mile, but were not included in the Morton proposal, and these have been roughed in in the light green. The withdrwal order that withdrew these, P.L.O. 5179 and 5251, had a paragraph two which said that if they weren't recommended, they would revert to (d)(1) in a status that kept them in the same condition as (d)(2). They were closed to mineral entry, they were closed to native selection and they were closed to State selection. So what we see is not just the Forty Mile wild and scenic rivers, but also all of these (d)(1), with as restrictive a withdrawal order on it as the wild and scenic rivers (d)(2) withdrawal in this area.

Now, surrounding this, in pink, we have what we call the Forty Mile block. That's the Doyon selection area, roughly 2.2 million acres. When we filed, we filed over both the wild and scenic (d)(2) and we filed over the (d)(1), not because we want to challenge the (d)(2) or because we want to challenge the (d)(1), necessarily, but because we didn't want to see a land pattern created in this area if these things didn't go into the system or—well, actually we got caught off guard on these. We hadn't read the withdrawal orders, so we thought these would be selectable. But we didn't want to see a land pattern developed where there was public domain land, not some type of conservation system land, tying up the river bottoms and us in the highlands. And also, when you look at these withdrawals, you've got some very complex withdrawals through here. They're spiderwebbed and you've got corridors of this and that and the other thing all through it. Now, we've done extensive mineral—an extensive mineral inventory, intensive mineral inventory might be better, of the Forty Mile block and I'm going to real quickly put—try to X on the map approximate locations of all of the prospects that we've got in the area, and by prospect, I mean, we've done geochem, some geophysical work. The geologists have been out, taken samples, and we feel that these are areas that merit drilling. I think they're important, because they kind of show at least where we have a real interest in this area, starting here, right in this area. We call it Discovery Creek. It's zinc, copper, and moly. Right in here, we've got Champion and Lead Creek. Champion is zinc, lead, silver. Lead Creek is lead and silver.

Actually up over the divide—and this kind of—Charlie catches us in this, too. Right in this area we've got Deer Creek. Deer Creek is lead, silver, copper, moly. I missed Ole Creek. Ole Creek is right in here, it's lead and silver. Over in this area right here is Derwent Creek. It's zinc. Coming back down right about in here is Granite Creek. It's tungsten. Right where we get these steps in here is Ruby Creek. It's tin, tungsten, zinc. Back right in here we've got Happy, it's tungsten, zinc. Over in this lode over here we've got Larson ridge, it's tungsten, molybdenum. Over here we've got Prospect, it's tungsten. Right in here we've got Mosquito, it's copper, moly. This is one project. We've got other projects, though. Right here, we've got Alaska asbestos, and I'm not free to tell too much information, but I will say that one of our consulting geologists who worked Wood's Reef in Australia, and the asbestos in Quebec, has estimated that this may be the largest asbestos deposit in North America, if not one of the largest in the world.

Now, some other things that we really haven't looked at, I'll put them in blue, too.

Mr. HARVEY. That shows as being outside the proposed wild and scenic river area.

Mr. WILLIAMS. Right. It's just north. Actually, it's right over the top of the ridge from the middle fork portion of the river. It's just upstream, if you can—the green is hard to see, but it's just upstream from the end of the north fork portion of the river and is actually bracketed by this (d)(1) that is as restrictive of a withdrawal as the (d)(2).

Mr. SILVER. Dave, is that the deposit that was identified in both the Andrus and the Morton bills for specific access across the Forty Mile?

Mr. WILLIAMS. Right. This deposit has been identified in every bill for access across the Forty Mile. In addition to these, we have what we call Washington Creek coal. There's Washington Creek. It runs out of our area into another area, into somebody's area. It hasn't been looked at too hard, because what we're doing is, trying to find all the stuff that hasn't been found. This was known. Our people have been in. They feel we've possible metallurgical grade coals in there. It's pretty isolated. It sure wouldn't compete with the coalfields we were talking about yesterday right on the coast. Of course, it might tie in with what we've got in here. We have had no intention and we have no intention of challenging the Forty Mile wild and scenic river, but we have a real access problem into these areas. We've been lucky enough that the asbestos has been written along with access throughout the whole (d)(2) process. Nothing was said about any of these other prospects throughout the Forty Mile withdrawal.

To get to some of them, the only logical routes are going to be across the (d)(2) lands. By logical, I don't even mean to say up the river valleys, but I mean across, at some point a crossing of the (d)(2) lands. By logical, I also mean routes that are going to minimize the impact when we go into the country. The asbestos right now, we're looking at a road routing probably something like this, out to the Taylor Highway. The Taylor runs generally up like this into Eagle. We're looking at the potential of coming at least to the Taylor Highway here and then we have an option. The one option that really makes this prospect look nice is that there is an asbestos processing plant right over here at Clinton Creek on the Canadian side. A pretty good rumor is that they're running out of reserves. They'll be shutting that plant down within the next 2 years. They're looking madly for reserves right now. That means that we could, potentially, get into production without the 20-year leadtime that it takes to put in the necessary infrastructure for processing. As a matter of fact, we're looking at maybe 5 or 6 years to production on this asbestos.

In order to do that, we'll probably look at a road somewhere on across into Canada, into Clinton Creek there. There is an existing road that does go over into Canada, but it's a pretty poor road.

If we go to foreign processing, we've a number of choices. But the best operation that we've been able to see is that we seal the ores and send them across the border to be processed. Then they come back across the border, processed and sealed. That keeps us clean with Customs, and then probably shipment out of some Alaskan port, which then leads us to a concern about the Taylor Highway. Three years ago, I think it was, Cassiar shipped from Clinton Creek back to our side and out at Valdez; was it? I think it was Valdez, because of a dock strike on the Canadian side.

I was driving the Taylor Highway at that time for a former employer (B.L.M.) and it got pretty hairy on the Taylor with those sea-land vans coming around those blind corners on that 50-foot, if you're lucky, road. So there is a concern that the Taylor Highway is the primary access into the country and there is a concern about the upgrading of that road and the capability upgrading that road through some of the wild, scenic or recreational portions of the river. I used to know them, but I can't tell you where the breaks are right now. Again, what I want to point out is that the interlocking nature of the (d)(2)—the (d)(1), which is as strict as the (d)(2). Even if we were to look at coming out on the other side to avoid the Forty Mile, the interlocking of the Forty Mile and the Charlie in their headwaters creates an almost impossible access problem for us into the Forty Mile area. Now, Doyon is not one of the corporations that's in the red this year and let's hope it keeps that way. One of the reasons we're not in the red and one of the reasons a lot of the corporations weren't in the red the past few years was, we were riding the boom, like everybody else. The boom is gone and we're all feeling the effects. What we're trying to do is to develop something where we can get off of the boom and bust cycle in Alaska and the only way we can do it is by developing the resources that were granted to us under the act, and we've got real problems here in this area, which is one of our best mineralized areas in all of the Doyon region.

Mr. HARVEY. Thank you very much. Are there any more comments on the Forty Mile? Yes?

Mr. THOMAS. Yes. Bob Thomas, of the Department of Transportation. I'd like to address some of the problems that Dave talked about. Aside from being access for minerals, the road was built about 1951. It is worn out, as was pointed out. It is also the only road access into Alaska through Canada and it's been used for that purpose by tourists quite a lot. We took a survey for the road users several years ago, and we can furnish this for the record. I think the recreational use of the river was quite high, but it wasn't really for floating. It was really for gold panning and the type of recreational usage you can get by being directly adjacent to the river. In about 1970, we started paperwork to upgrade this road, because as I pointed out, it is worn out, there's no surfacing left on it at all and in many areas, it's substandard width, substandard alinement, substandard grade. The first go-round, we prepared an environmental impact statement and it's important that I go through this history a little bit and indicate what I want to point out. We found there were no real major environmental impacts with upgrading the road, as long as it stayed along the existing route. Because of the (d)(2) proposal, we were asked to go back and make a final impact statement, since our first go-round was going to be just a negative declaration. We didn't want to do this, but we ended up doing it with the promise that the BLM or the Department of the Interior promised that it would only take a few months. Since 1970, we've worked extensively. We did just get that approved in December of 1977, so it took us some 7 years to get just the environmental clearance and the reconnaissance work done. We do have an alinement through there and it follows the existing road very closely, except for a few areas.

We have been informed that if this (d)(2) area does, in fact, become a wild and scenic river, that we may be forced to go back to stage one and redo our environmental impact statement, even though it was done with this recreational area in mind. That would set us back another 7 years, I'm sure, if we had to go back and do it over again. We're in the process now of upgrading that road on about a 16-, 17-mile project, but it will take us some time to do that, so I'm sure this will pass before we complete that. I would suggest that if any (d)(2) or recreational area is established here, that language be incorporated that would recognize the approved environmental impact statement for the new alinement, mainly because it was done with the Forty Mile recreational area in mind and was negotiated with the BLM and the DOI and all the other agencies, simply to keep us from going back to stage 1 and having to start over and delay this for another 7 years or so. There's a similar situation in the Tetlin area where we have an improved environmental impact statement and alinement. I think it's very important that language recognizing this be included.

I would also suggest that that area of the Forty Mile network, between where the Dennis Fork and Mosquito Fork join, down to where the old Forty Mile roadhouse was, be classified as recreational rather than wild and scenic, because that's the type of use that's being achieved. The water through that particular area there is quite warm and you can float it in innertubes. They do it quite a lot. I would like to also point out that the Canadian side of this highway is being upgraded to 40-foot-type wide roads, good curves, and good surfacing on it. When you get over into our side, it degenerates into a worn out road. As more and more people use this route as an alternate, more and more demand is going to be placed on us to upgrade it. Also if something happened to the Alaska Highway, this would be the alternate route to Alaska surface routes. I think that should be recognized.

Mr. HARVEY. OK. Yes?

Mr. FANKHAUSER. Bob Fankhauser, Alaska Miner's. I'd like to ask the Doyon representatives not to reveal any confidential information here, but can you give us an idea of how many of those prospects and areas of mineralization you're talking about were known in the literature and how many are new discoveries?

Mr. WILLIAMS. To the best of my knowledge, the Alaska asbestos would be one. Helen Faulkner found that, and the Washington Creek coal. I don't think any of the other specific prospects were known and it's always called a part of the trends that have been in existence.

Mr. FANKHAUSER. That's a point I'd like to have the committee be aware of, the Forty Mile district has been a known area of gold mining and other resources of volcanogenic-type deposits for some time. I would submit to the committee that this does represent the extent of our knowledge of Alaska in that it's very broad in general and we can project these trends that we talk about, but new deposits are being found every year.

I've worked in the Forty Mile area some and I know that others have, and each year we've made major discoveries, and the other point I'd like to bring about is that quite a few of these older occurrences that have been dismissed in the past as being noncommercial. These things change and this particular one about the asbestos is one of the established ones here that we can point to this idea that new mines and new areas of development are likely to take place in the areas where mineralization has been known for years and it's defined in general by just a large belt. Thank you.

Mr. HARVEY. Thank you. Any other comments? Yes?

Mr. WILLIAMS. For the record, I would like to say that we have had some preliminary discussions with BLM on the road into the Forty Mile country and the Alaska asbestos deposit. Nothing firm, just kind of kicking ideas around, but I think that we're pretty well sold on the concept of a public road to allow access into the north fork of the Forty Mile where access doesn't exist. To the best of my knowledge, nobody's been on it. I don't think the DOI made it down and the BLM has never made it down. Some oldtimers that mine gold up Gold Camp, which is above the asbestos, were probably the last people up on that. So we're looking at a public road in an attempt to provide access into an otherwise inaccessible river, although I recognize, too, inaccessibility is valuable.

Mr. HARVEY. Any other comments? Jules?

Mr. TILESTON. Maybe as a wrapup then, let me hit several things that have been discussed. First of all, I was responsible for the wild and scenic river in my former employ, a study of this area. I've been on the ground or over it in helicopters as recently as last August with my family on vacation. We spent 10 days going down the entire river system into Canada. In terms of canoeability on a road net system in the State of Alaska and taking into account safety, aesthetics and all of the things that you would put into a nonwilderness status—now, I stress this, because there are other rivers that are in wilderness character and I'm stressing the accessibility—this is probably the No. 1 river in the State of Alaska. In terms of its challenge and in terms of its safety, that is, you can take your family and have the option of a safe experience and this does not apply to many rivers.

In terms of conflicts of land use, there are some potential ones. Doyon outlined the one on the fact that the land status now has segregated it until Congress takes final action. The other one is that the several of the bills do have different boundary widths. The original withdrawal on the Forty Mile was done on the basis of a 1-mile wide boundary and that is the actual withdrawal. The environmental impact statement was written on that basis and in my judgment, is defined on the basis of the narrow topography, because by the time you get back 1 mile from the river, you're clear over into the next stream. It's very closely dissected. You have a very steep canyon environment and by the time you move almost one-half mile back you're completely over——

Mr. HARVEY. You said the withdrawal was 1 mile wide or one-half mile on each side?

Mr. TILESTON. No, no; 1 mile on each side. Excuse me.

Mr. HARVEY. So it would be 2 miles wide.

Mr. TILESTON. Two miles wide, of course.

Mr. WILLIAMS. If I may, actually it's three miles, because it's the section the river runs through, plus a section on either side. That's the way BLM is showing it on the plats.

Mr. TILESTON. In terms of the impact statement, dependent on definitive boundaries that might go on in the analysis, but it went through in the impact statement review process, both in the draft and the final. It was on a 1-mile topography limit. Now, that goes in and out. What you run into, however, and one of the bills does contain—what is it, Jack, a 4-mile or a 2-mile?

Mr. HESSION. Four-mile.

Mr. TILESTON. In a 4-mile withdrawal in this area, there is no land left because of the close relationships, and you can see it behind you on the map. In other words, it really takes in there all of the mineral deposits that are inside that type of a boundary. There is very little conflict other than access on what has been previously studied and recommended. The environmental impact statement did recognize highway relocation and its safety requirements in the fact that it was being presently used on an infrequent basis for commercial haul out on asbestos. It also is a very heavy recreation area used by tourists, tour bus systems and this sort of thing, as a primary net into Dawson and the Gold Rush history there. In terms of actual recreation use, I'd say the predominant use of the river today is recreation, but there is definitely mining access and it's very important. Most of that access is by boat. There is substantial subsistence use in the upper tributary areas, both in the form of trapping by native people living to the south along the highway and from Eagle. It is quite heavily used and many of the historic cabins that are located up in the area, which were associated with the old telegraph line built by Billy Mitchell, are used now for that purpose during the wintertime, so you do have a heavy use of subsistence trapping, this sort of thing, in the area.

Mr. HARVEY. One more, this gentleman in the back?

Mr. BLAKESTED. My name is Rod Blakested, representing today the Alaska Miner's Association. I'd also like to reiterate again that I'm not really prepared to speak on the Forty Mile River area, but it just so happens that it is on the map that I've brought for other purposes, which we'll get into later today. The Forty Mile River area is in the Eagle Quad, that section that is under discussion is in the Eagle Quad right here, comes down to the Dennison Fork and Mosquito Fork, which is right in this area here. This particular map, which I will submit a copy of with my written testimony on this area and another area which I will speak of or speak about later today, I will do at a later time. But I would like to point out that on this particular map, the yellow colors which you see on these streams are known and past producers of placer gold. There are a few sections of the Forty Mile River area, especially in the vicinity of Franklin and in the vicinity of Chicken, right at the Dennison Fork and the Mosquito Fork area, where there has been quite a bit of gold produced in the past. But I would like to point out that most of the creeks that drain into the Forty Mile River area have placer gold and have had mining activity of the placer nature in the past. There are a considerable number of placer miners who are operating on these creeks today. We just heard some mention about the people that are doing subsistence, the natives that are doing subsistence living off the wildlife in this vicinity. There are quite a few miners whom I know and am familiar with, however, I do not know what their total numbers are.

I might hazard a guess that as many as 100 or 200 people are employed seasonally on these creeks in placer mining, that is just a personal guess and might not even be a very good ball park figure. I would just like to point this out, that there are people with prior rights as far as the (d)(2) legislation and the selection of the Forty Mile River area is concerned. These people have been mining here since the turn of the century. Some of the families have been here since that long and some of these creeks have been active for that long as well. So I would just like to point out there is quite a bit of placer gold here and that other work done by private companies in this vicinity. Work that I have done for private companies has shown that this area, in general, is fairly highly mineralized. I can't really point to specific areas of mineralization in this particular area, because I'm not prepared for this today. My written testimony and when I submit this map, will point out some areas of known mineralization which should be considered in the legislation for this area. Thank you.

YUKON CHARLEY AREA

Mr. HARVEY. Thank you very much. I think we have to move on to the Yukon Charley area. If anyone else has anything else, they can just put it in for the record. Do you want to go ahead?

Mr. STENMARK. Richard Stenmark, Land Use Planning Commission. Rather than dig out that other large map, I'll just point out the region we're going to be addressing next on the map here. The regional context for our purposes here will be the eastern coastal plain of the arctic, the Eastern Brooks Range, the Upper Yukon Basin in here, up through Eagle and the northern flank or drainage of the Yukon Tanana Uplands, as well as the Rampart section of the Yukon in here. So it's pretty much from the trans-Alaska pipeline to the Canadian border.

About 61 million acres are involved in this region. The lower slopes are basically closed by the boreal forest, which extends northward into the southern valleys of the Brooks Range. That gives way to the tundra systems of the arctic mountains and the North Slope. The weather of the Upper Yukon Basin consists of some of both of the hottest summer and coldest winter temperatures in Alaska. Arctic climate prevails north of the Brooks Range, with brief summers and with winds and fog often persistent along the coast. Communities are few within the region, with the largest settlements now at Fort Yukon and Prudhoe Bay. Fairbanks, in this context, lies just out of the region to the southwest. Access is mostly by air or in the summer by boat along major waterways, or in the very far north, along in August, some barge traffic and so on can come in along the Arctic coast into the Prudhoe Bay or McKenzie Delta area. Industrial traffic is occurring along the pipeline haul road route, but the road is not yet open to the general public. Local industry consists of several small mining operations, local sawmills, oil exploration in general, some tourism and guided hunting and fishing. Oil production and hydrocarbon exploration at or near Prudhoe Bay have now become the predominant industry of the region. Native land ownership in the region will total about 15 percent of the land area. To date, the State has about an equal amount and further selection is desired. The nearly 9 million acre Arctic Wildlife Range in the northeast corner constitutes the only major Federal reserve at this time.

Proposed national interest lands areas of the region are the Eastern Brooks Range, proposed primarily as an addition to the Arctic Wildlife Range, the Upper Porcupine River area, including the Sheenjek and Colleen River drainages, variously proposed as additions to the range or as national forest, the Yukon Flats and surrounding uplands, again proposed either as a wildlife refuge or as a national forest, and the Upper Yukon River corridor in the Charlie River drainage, proposed as a national river area, national preserve, or national forest, essentially. Proposed rivers lying outside the larger areas include the lower portion of the Ivisak River, down to the junction of the Sag, Birch Creek, and the Yukon River, what we call the Rampart section, down below the flats, and one other—well, there are wilderness areas in most of these considered as well, wilderness in the existing Arctic National Wildlife Range is of significance. That concludes my remarks. To begin with, specifically, however, we want to address the Yukon Charley proposal, which is mostly 100 miles or so long corridor from the Yukon River here, from the Canadian border over to the vicinity of Circle and that will extend somewhat both north and south of the Yukon River and additionally, the Charlie River drainage to the south.

Scenic, Landscape, Historic and Archeological Values

Mr. Brown. My name is Bill Brown. Up until a few months ago, I was working with the National Park Service as key man in the Yukon Charley area. I've spent about 2½ years of intermittent residence up there and I've been on the ground in all seasons, trying to get to know some of the people and some of the landscapes involved. I'd like to point out that the Yukon is the only major continental river that is uncontrolled, flowing through the United States. There is a small control facility at Whitehorse Canada, but for most of the 2,000 or 2,300 miles, depending on where you put its headwaters, the Yukon is an uncontrolled river. The Charley is a major river basin of some 900,000 acres. It is an entire drainage as drawn on the various maps in these various proposals. These two major features produce what I'd like to term a historical environment, where a number of different kinds of experiences can occur. There have been human beings in this area for probably thousands of years. It's not an area that has our concept of wilderness and it has a classification that may be useful in these hearings. It's been a backyard area for people for a very long time. Archeological explorations and excavations and surveys in the Copper Creek area, which is one of the tributaries of the Charley 2 summers ago, found some 12 sites in a 3-day survey, that have lithic artifacts that may reach back many thousands of years. These people were hunters and these sites were on game observation points. I'd like to start with that historical theme and trace a concept that Fredrick Jackson Turner first used in his essay around the turn of the century on the influence of the frontier in American history. He chose a strategic observation point by which to view the panoply of American history. It was Cumberland Gap, and he showed the movement westward from the Atlantic seaboard to the Pacific.

You can do pretty much the same thing in the Yukon. It has been an area that has been used for migration. This was an unglaciated area. Early man came through this area as they moved from Siberia into the rest of the New World. The Indian people who have lived there for thousands of years and adapted to this environment are still there. The Athabascan people. About the middle of the last century, two spheres of influence of Imperial time intercepted in this vicinity, the Russian influence from Bering Sea, in specific, the Canadian Hudson's Bay Co. influence from the East, and it changed the way of life of these people. They became trappers, rather than living strictly off the sustenance of the country.

Later, the best known activity, the mining which long preceded the Klodike strike, but is highlighted by the klondike strike and the remnants in the countrys left some 150 sites which are associated very directly with the period. The surge of miners back and forth as strikes were found in Canada and in Alaska created a transportation story that is very interesting. It's reminiscent of the Mississippi. There were at one time scores and even a couple of hundred during the height of the rush, shallow draft sternwheel steamers operating on this river. They could have been something out of Mark Twain. After the mining rushes faded, there was a consolidation and a creation of communities in this area. There was then a depopulation and the people who were lift were hardcore miners and trappers who just wanted to stay in the country. That situation obtained until very recently, the last few years, the last part of the procession of history that's gone through this area is a group of people who are very largely escapees from the 20th century.

They are people who have become trappers, they come up for small-scale mining into this area and it's a place to get away from it all. Many of the people who live in the city of Eagle and along the river have this aim. Aside from this strictly human history, there is a larger blending of historical theme at the Yukon Charley. If we go into paleontology, I had hoped to have Dr. Carol Allison, who is the curator of paleontolgy and theology at the University of Alaska Museum. She made certain that I mentioned the fact, she is a second generation Alaskan and she is not concerned about who manages the land, but she is concerned about the paleontological resources. I believe there is a colleague of hers, a professional colleague from the Bureau of Mines who will probably mention the paleontological sources. I will only do so briefly, because he would be more technically qualified. In the areas to the east of the Yukon Charley area, there is a wedge coming in from the Canadian border that is aerially and in terms of almost uninterrupted stratification, conceivable the finest fossiliferous series of exposures in the world. Dr. Allison has written many articles on this, summaries. There is a long bibliography of USGS surveys and scientific studies there of Dr. Allison, regretting that she could not be here, will submit written testimony to the committee within the next 2 weeks. If we look at the paleontology, then, which gives us a story of biological evolution, solidified in rock, and if we also look at the remnants of living biological communities there, for example, remnants of the Arctic steplands that are on Castle Mountain, right on the Yukon, some communities that have been discovered by the Institute for Northern Studies that's done two summers of research up there. If we look at the human history that I have very, very briefly sketched, we see a larger concept of history here, of geological history, of biological evolution and of human beings over many thousands of years adapting to a very rigorous environment.

Now, in this setting created by the Yukon and the Charley, it's possible to retrace, if one wishes, this feeling of going back through centuries. The area is basically short of man's sign, even though people have been there for a long time. They've roamed around through the Charley. There aren't any empty valleys and there aren't any unnamed mountains. People have known these landmarks and they've traveled through this country for a long, long time. But in our concept, it is truly wilderness area, particularly the Charley Basin. You can float down that river and see the same silhouettes, you can see the same aspect of country with only a few fading remnants of human occupation that are discovery sites along the way. I don't know if it is appropriate at this time to mention other things that are under other headings. I've just come into these proceedings and I do not know whether you're going item by item.

Mr. HARVEY. Yes, we are.

Mr. BROWN. OK. That's the story as far as I'm concerned, on scenic, archeological, historic, paleontological.

Mr. GRAHAM. Mr. Chairman, Hatch Graham with the Forest Service. As you know, the Forest Service put an Alaska planning team in Alaska in 1972. We looked throughout the interior of Alaska for areas having many values. We did look at this area and I would like to submit for the record, a description of our—what we called the program for people from the Department of Agriculture, and we'll make this available to you.

I don't want to be redundant and comment on every aspect of every one of our previous proposals, but I would like to say about the Yukon Charley and actually the 40-mile area which is the approach for most people to the portion that's under consideration, that this country is perhaps, in the summertime, one of the most inviting areas in Alaska. It does not have the spectacular grandeur of the Wrangell Mountains, nor the remoteness of the Brooks Range, much as has been described by the gentleman from the Park Service. We believe it is an area that invites people to come and visit. It has a gentle scenery, it has broad plateaus, tundra-topped mountains that rise to 5,000 or 6,000 feet, beautiful rivers. We believe this is an outstanding area for the public interest for recreation.

Mr. HARVEY. Thank you. Any more comments on the scenic and landscape values? Yes?

Mr. GORDON. First, several traditional values that I guess fit in this section rather than under wildlife, and then a brief overview of the regional values. Bill's absolutely outstanding job of giving the overall feeling for the background. I want to point out that Eagle, the village of Eagle, which is outside of the boundaries of the proposal, is very much related to it and to the Klondike Gold Rush International Park to the east, in tying together man's travel on the Yukon River and the evidences of that plus man's settlement early in the century in connection with a telegraph route on the north to the coast of Valdez. There are—There was an Army Post there. There was the first courthouse in Alaska.

There is some excellent remaining evidence, very carefully tended by the people of Eagle, at present in cooperation with the BLM and this value intimately relates to and I presume would be mostly interpreted with the values within the Park Service boundaries. The area is unglaciated in terms of continental glaciation and, therefore, a long period of evolution of the surface land forms and the complexity of the vegetation community has had time to develop. This is not true, of course, in the major mountain areas or along the coast, so this represents a type of landscape and a type of vegetation in terms of its evolution, which is quite different in character than in the other proposals. Also the paleontological record has continued until geologically recent times, in that evidences in exposed river bluffs continually turn up, evidence of sometimes actually even flesh from large mammals which once inhabited, which inhabited the area up until 8,000 to 10,000 years ago, just after the end of the most recent period of the Pleistocene, particularly mammoths which sometimes turn up almost in their entirety. We have an unbroken record, right up to the present time. In terms of the landscape, three units comprise this landscape. It is one of the two interior Alaska landscapes in which the greatest diversity of significant features occurs in contiguity with one another. Bill has already referred to the Yukon River, but I want to emphasize a major example of a section of a major continental river, which although it has been used by man for thousands of years, still retains largely, in a visual sense, its primitive character.

It is analogous in some respects to the Palisades of the Hudson River. There are very abrupt rock faces and bluffs all along the river. We'll talk about the peregrines later, and they, in addition to having this enormous paleontological value, are strikingly contorted, finely layered, some of them are rather brightly colored and for the traveler along the Yukon River, it gives an impressive visual experience which I think is the equal of any of the high mountain part. To the north is a portion of the Ogilvie Mountains, most of which lie in Canada. Let me read a description by—a brief description by Clyde Worhoffky of the U.S. Geological Survey:

> These mountains contain sharp crest lines, precipitous slopes and deep, narrow valleys interrupted by gorges, with up to four thousand feet of local relief, massive cliff-forming sedimentary rocks and greenstone. These are the most spectacular range of mountains visually in the interior of Alaska.

Assuming you consider the Woodtikchik country, not in the interior. It has not been generally recognized or known, because there is no easy access into the area, and the river valleys of the Tatonduk which is immediately northeast of Eagle, the upper portion of Hard Luck Creek, which is a tributary of the Nation. Three Castle Mountain is a name which gives you a feeling for it. The rocks are generally rather dark to medium gray color. Some of them on the Tatonduk are rather pale, almost whitish. They have a massive character, rather similar to the Arrigetch in that it looks—from the mouth, it looks rather like a steeply inclined roof, completely smooth. There are also redbeds, red rock exposures, and one arch has been reported. I might comment that when I was involved in writing the environmental impact statement, I hadn't seen that area, and the USGS geologist, Mr. Brabb, I believe it was, wrote me a letter and said, "Why the devil didn't you emphasize the magnificence of the Tatonduk?" The USGS was well aware of it.

The third feature is perhaps the one that's been most discussed, the Charley River drainage. This is a country that one of my fellow Park Service planners used this phrase about: "A land of horizontal and temporal superlatives." Temporal, Bill has talked about. This refers to the long, long evidence of paleontological and human use through time. You feel it, you sense it in the history. You can see it. The horizontal superlatives, these are very relatively high mountains. They're equivalent to the highest of the White Mountains or Mount Katadin in Maine, but they have overall, a rolling, gentle appearance, ridge after ridge after ridge after ridge going to the skyline. In some ways analogous to what the Andirondacks would have been like before the white man came, but the topography is more even, more rounded. There are local glaciation evidences, a few cirgues, but the predominant character is this vast, rolling plain. This is the best example I have seen in Alaska of the interdigitation of spruce forests and open tundra.

Apparently, I'm inferring this. I don't know for sure. The lack of fires for a long period of time, perhaps something in the soil, leads to the lack of high brush. When you get on the ground, there's a lot of low birch brush, but there's minimum, if any, places of high brush separating the forest from the tundra and this is quite distinctive and unique in Alaska, in my experience.

The Charley River is a visual unit which flows through a V-shaped valley in most places, with benches at varying elevations above the river. The benches tend to be primarily tundra. The rims of the benches tend to be forested. There are period sheer bluffs, layered rocks, some intrusives along the river. We'll talk about the sheep later, but the feeling is of a corridor through which this extremely clear river which BOR considers to be as clear as any river in the State of Alaska. So you have quite a separate visual experience in the Charley basin. This is for a geological reason, namely, that the area not being glaciated, you have the rounded summits, steep-sided slopes and narrow V-shaped valleys and in most of the park proposals in the State, you have wider U-shaped valleys. Thank you.

Mr. HARVEY. Any more comments on the scenic and landscape? Yes, Jack?

Mr. HESSION. Jack Hession, Alaska Coalition. I'll sum up the river features for you very briefly. The Charley has, in combination, several features which make it highly exceptional as a recreational resource. The scenery, which you have heard about. It's a white water stream, roughly class three to four almost throughout, and it's clear, as we've heard. You seldom—as I've noted earlier—you seldom get that combination in Alaska, that combination that makes it so attractive. There are wildlife viewing opportunities; there's sheep on the lower bluffs; excellent fishing; and the possibility of seeing raptors, by the way. And its pristine quality, unlike the neighboring Forty Mile watershed, no one is in there with bulldozers pushing the placers into the river. There's no polluted side streams, there are no side tributaries that have been converted into single use. It's a wilderness river experience.

Mr. Dapkus. Dave Dapkus, Heritage Conservation and Recreation Service. After these gentlemen have talked about the river, all I can say is, it's great. They've covered everything. It is an excellent float for the experienced canoeist or rafter or kayaker. It's a good river and they've covered everything.

Mr. Harvey. Thank you. Any more comments on the scenic and landscape? Now let's talk about wildlife in the area, what's there and who is catching it and shooting it? Anybody want to start it? Go ahead.

Wildlife and Fish Resources and Uses

Mr. Gordon. I'll just hit certain highlights. I hope that Bill or Dick Richardson will hit the overall. The most noteworthy feature is that there is a population, say, of—I don't know how many peregrine, a significant number of peregrine falcon which are nesting on the bluffs along the Yukon River. Also along the bluffs along some of the tributary streams, the Charley, the Kandik. This population is healthy. It is one of the very, very few populations in Alaska which seems to be maintaining the productivity ratio of young birds, successful breeding. The apparently different populations of peregrine migrate during the winter to different areas. Many of the populations of the one or two, depending on your viewpoints, interior races of the peregrine falcon, while there are considerable numbers of adult birds still nesting in Alaska, they are not producing young. The reason, presumably, is because they are going to areas of the lower 48 or further south, Central and South America, perhaps, where they are picking up a resistant pesticide, and I won't go into the history of how this has caused their decline. This particular population appears not to be significantly affected by pesticides on their wintering grounds, and therefore this is one of the most valuable, if not the most valuable, populations in the Arctic and interior races of the peregrine falcon in Alaska.

Of particular interest in the area are the Forty Mile caribou herd, which calve just east of the proposal area in most years, migrate across the areas in early summer, weaving its way through these low valleys. It is preyed upon at this point by grizzlies. A surprising number of grizzlies seem to be present in the vicinity of these caribou. Wolves, to some degree, and then it moves on. Dick, perhaps, will discuss the movement pattern, but it is a significant early summer and then late fall travel area for the Forty Mile, which at one time numbered 5—roughly 500,000 animals. It is now, what, Dick, 6,000 to 8,000?

Mr. Bishop. About.

Mr. Gordon. It fluctuates considerably. There is a very unusual sheep population, in that sheep live along the—or conceivably at least, along the bluffs of the Charley River, right adjacent to the lowlands. They're easily seen from the river. I'm not sure exactly what their annual movement pattern is. I haven't seen them up there on that area in the winter, but in any event, there are very few sheep populations in Alaska which spend part of the year on lowland river bluffs. I think, other than the fact that this is a general—oh, one other thing. For migratory songbirds, this is probably the most diverse area of mountain and subalpine bird species of hatchery of birds, so-called songbirds that I have found in Alaska. There are some species, such as the Smith longspur and various others that are generally localized and rather uncommon, that seem to be quite prevalent in this area. Thank you.

Mr. HARVEY. Thank you. Any other comments on the wildlife values? Yes?

Mr. BROWN. I wanted to mention in connection with the peregrine that Doctors Cade and White have been studying in Alaska for the past 10 or 20 years and between them, have isolated the Charley basin and that main stem of the Yukon within the proposed area as the most significant peregrine profusion still in Alaska. The only other area that is even mentioned in the same class is the sections of the Porcupine.

Mr. HARVEY. Thank you. Any other comments on the wildlife?

Mr. WICKES. Mr. Chairman, Jim Wickes, Alaska Department of Natural Resources. In terms of the overall habitat values of the Andru Yukon Charley proposal, over 260,000 acres rate in the second highest level on a statewide basis. The balance of the habitat falls in moderate potential on that system.

Mr. HARVEY. Go ahead.

Mr. BISHOP. Dick Bishop, Department of Fish and Game. The comments that have preceded mine are certainly correct. With regard to the calving area of the Forty Mile, I think you meant west of the Charley River.

Mr. GORDON. I'm sorry, I meant west.

Mr. BISHOP. Yes. But nevertheless, the portions of the Charley River area, as well as to some extent the Forty Mile River area that was discussed before, are traditionally used by the State's Forty Mile caribou herd, which is about the size that was described, 6,000 to 8,000 animals. The area, in general, is important from the standpoint of not only caribou, but moose and moose habitat, black and grizzly bears, fur bearers, small game, upland birds, and so on.

There is an important local use of these various resources by people that Mr. Brown mentioned, living along the river, on an essentially subsistence-type basis and there is also recreational use of wildlife in that area, both consumptive and nonconsumptive by people from other parts of the State. Access into it is by boat, as well as to a very limited extent, by air to the upper Charley River. I think that's all I would comment on on the wildlife aspects of the area.

Mr. HARVEY. Yes?

Mr. GORDON. In connection with the use, something that some of us, I think Bill and I, feel very strongly about is that the—there needs to be provision, since it is proposed to continue the existing uses, particularly related to subsistence and wildlife, to provide for the means for people to continue being able to have access to the country by traditional means and to be able to survive in the winter. This particularly means being able to maintain trapping cabins, which is a very, very important use, even in the Charley River area, primarily along the Yukon, up some of these side ranges. This would not in any way interfere with protecting the wilderness values, but is essential to allow people to survive in continuing these uses.

Mr. HARVEY. Thank you.

Mr. BROWN. Quantitatively, we have a study performed based on residence in the area for most of the year. On the subsistence uses in the Yukon-Charley area, there are three communities that are involved, plus the people who are living down along the river. There are about 14 family or single unit groupings living along the river at the principle tributary streams coming into the Yukon. Those are the river people. There are people living in Eagle Village, Indian subsisters who utilize at this time mainly the upper third of the Yukon corridor.

There are people living in Eagle Village that use the corridor for moose hunting, fishing and so on, and there are people coming upstream from Circle. There are about 300 of these people who are dependent on subsistence, a smaller number, approximately one-third of those, who are actually involved in the subsistence activities and the sharing and so on that goes on, and I support the notion that there should be some provision for this continued historical use of the country to go on.

Mr. HARVEY. Yes, Jules?

Mr. TILESTON. Jules Tileston, Bureau of Land Management. One point that the committee needs to be aware of and it deals with endangered peregrine falcon, this is a traditional nesting area. It nests basically on the same cliffs that the paleontologists are climbing around on. It exists under the same cliffs that the camper and recreationist is camping on, because the Yukon, itself, is silty and you must stop in the side ranges to get your drinking water unless you want to filter it out or carry it with you. As a result, we do have a direct conflict of human use and an active of Congress requiring very restrictive actions. If we should eventually——

Mr. HARVEY. You're talking about the endangered species?

Mr. TILESTON. The endangered species—apply the restrictions which now exist at Sagwan Bluffs, which is complete closure of air traffic—there have been severe restrictions placed on use of aircraft, use of people by—for scientifics, recreation and everything else, and this is an area of very severe conflict potential and it needs to be addressed.

Mr. HARVEY. Jules, excuse me. Have you started the critical habitat determinations on the peregrine?

Mr. TILESTON. Not as such, but this area will undoubtedly meet it and there have been numbers of studies done by fish and wildlife, by BLM, by Park Service, by the State. The nest sites are known. In fact, I believe this is one of the areas where, several years ago, there was a reported interest of CIA, et cetera, of picking up peregrine in exchange for oil or something like this.

Mr. WILLIAMS. Dave Williams. I'd like to speak for myself now. Really what I'd like to do is, I'd like to ask Bill Brown, of the river people, Bill, how many have come into the country since the passage of ANCSA, since the withdrawal of the river under (d)(2) and in violation of the withdrawal?

Mr. Brown. About two-thirds. There are a few valid land rights there and people have attempted in the recent periods to sort of consolidate on some of those places. I think it is well to point out, Dave, that I'm not advocating a violation of law, but I am advocating a number of things that are contained in various proposals that have come out. A fresh look at what's happening in this area. There have been different cutoff dates proposed over the years. One was the 1971 date of ANCSA. Recently, in one of the bills, there was a cutoff date of January 1, 1977, I believe. There has been a very great difficulty in dealing with this matter. I'm fully aware of the fact that a land rush into that area would be foolish. The area is fully occupied in terms of a current subsistence bearing capacity for fishing, getting meat, and trapping. This is the word of people in Eagle Village, it's the words of people along the river.

I don't really want to approach the question of what's legal and illegal now. I would like the committee to be aware that there is a population that is subsisting in the area and that a fresh look is needed and if there is to be a termination of such subsistence activities by newcomers to the area, then conceivably some sort of transition and adjustment period would be allowed to where people can gracefully get out, if that's the determination that is made.

Mr. Williams. I'd like to say—again, Dave Williams, private citizen—that if those of us who have attempted to obey the law since 1971 and who have to live under the withdrawal, and I'm speaking for myself and a lot of people I know in Tok, a lot of people I know in Eagle, and people I know in Fairbanks who would sit very poorly to see Congress validate these rights that have come in in violation of the withdrawal, because we would have liked to have been out there, too.

Mr. Harvey. Are there are more comments on wildlife? We'll move this part of the discussion in the record over to the non-Federal lands area. Go ahead.

Mr. Mower. Could I add one more thing on the wildlife? My name is Fran Mower, I'm with the U.S. Fish and Wildlife Service. With respect to the endangered peregrine falcon, the U.S. Fish and Wildlife Service, along with other Federal agencies, has formed an interagency peregrine falcon recovery team. That team has drafted a statewide peregrine falcon recovery plan. That plan is currently being reviewed in the Endangered Species Office in Washington. In the plan, it does have criteria for critical habitat. When this plan is reviewed and approved, further steps will be initiated along the lines of critical habitat. Thank you.

Mr. Harvey. Thank you.

Mr. Bishop. Dick Bishop, Department of Fish and Game. I have two very brief comments that relate not only to this area, but to others and the discussion which just ensued. The first is that in some proposals and in the present markup of H.R. 39, there is a differentiation between trapping for subsistence use and a commercial use, and I'd like to point out that it's relating to this area as well as others, and in most cases the trapping that's presently done is generally what would be considered commercial trapping, as it's defined in H.R. 39, yet it's a proportion of the subsistence lifestyle. So I think it's well to remember that people may, in fact, trap, take hides, sell them to produce income, in order to help maintain their subsistence lifestyle, but by some people's definitions, it's not considered a subsistence pursuit and it's a sort of a semantics difficulty. But it's well to keep in mind.

The other consideration I think that I would like to comment on here is that nowhere in the general outline of the topics that are discussed is the issue of considering the subsistence lifestyle as a resource. We've discussed fish and wildlife resources and others independently of it, and to a large extent, many of these relate to the general consideration of a subsistence lifestyle. The question of people, perhaps, having moved in against the law or something like that brought it to mind.

In various pieces of legislation, the subject of the rights of individuals to continue living on the land and so on has been considered, and most often I think people think of it in terms of the rights of the individual. Seldom do I hear the question of the value of sustaining the opportunity for a subsistence lifestyle addressed, and I think to some extent that's what Mr. Brown was getting at. There are particular difficulties in that area. But I think it is one value that is rated highly in many parts of Alaska and it needs to be kept in mind when we're talking about these various other resource values.

Mr. HARVEY. Let's go on to the renewable resources area and timber, agriculture, forests. Go ahead.

Renewable Resources

Mr. GRAHAM. Hatch Graham, Forest Service. The historic use of the timber resource along the Yukon River was to fire the boilers on the steamships and there were notable areas of fairly heavy cutting along the rivers. The timber resource actually in this area is not large, but it does have the values for wildlife habitat and watershed protection, as well as the local uses for fuel wood, house logs, lumber, coal, and mine timbers. Not a significant commercial amount. As far as agriculture is concerned, it's presently limited to a few garden plots. There are some upland soils from the lower Charlie down to Circle that could be considered agricultural, but in only a limited sense and in a rather narrow belt.

Mr. HARVEY. Any other comments?

Mr. WICKES. Yes, Mr. Chairman. Jim Wickes, Department of Natural Resources. In terms of agricultural potential, as Mr. Graham has indicated, it's confined pretty much to the valleys of the Yukon. Our assessment finds almost 400,000 acres out of the 2.5 million acres within Mr. Andrus' Yukon Charley proposal as having some potential. Most of that potential is in a moderate category, below the third level on the Statewide ranking system of 10. In terms of forestry, there are roughly 1 million acres that would rank in the top four level of the State on that basis, and another somewhat related resource, a land capability index, which I believe Mr. Hansen has described earlier to you. There are roughly 100,000 acres of land that's generally well drained, of suitable slope for settlement and this sort of thing, but these are all pretty much congregated in the river valley.

Mr. HARVEY. Thank you. Are there any more comments on renewable resources? All right. Let's go on to the non-Federal lands situation, State selections, Native selections and private use in the area.

State and Native Land Selections

Mr. BROWN. I have one comment only. Dave mentioned the prospect on Derwent Creek in the Charley drainage. As can be seen from the map up there, depending on which boundary we're looking at, there's approximately 10 townships of regional deficiency lands within the Charley Basin. I raise this question, because one of the conceptual rationales, I believe, for the—some kind of a preservation of the Charley Basin is that it is an entire river basin. Should those 10 townships be developed and access and intrastructures and the whole rest of it that follows, there would be some question as to the remaining integrity of that entire wilderness classified drainage, and I would hope that some kind of accommodation, some kind of arrangement can be made so that the river basin is retained as in its wilderness capacity.

Mr. HARVEY. And you're referring to the Native selections?

Mr. BROWN. The regional deficiency lands; yes. The Native selections.

Mr. WILLIAMS. Dave Williams, Doyon this time. That's for the opening, Bill. Can I go back up to the board? We covered most of the prospects on the south side earlier. All right. The White Creek is over in the area of environmental concern. Again let me say, the Yukon Charley, we did overfile the (d)(2), again not to challenge the (d)(2) but in order not to see a strange land pattern created, should the Charley River not be included within the national wild and scenic river system. As far as what you said about this area, it's just something that's going to have to wait to be seen. We're going to have to wait for Congress to act, we'll have to wait to see what we intend to do. We're always interested in talking about it.

Let me go up north, now, in the Kandik and I'll use the black. This is our Kandik withdrawal, 3½ million acres and we've got it all filed on. The State has got an underfiling on probably the southern two-thirds. Do you have the acreage on that?

Mr. WICKES. Not just on the Kandik; no.

Mr. WILLIAMS. OK. That was done by an agreement that was brought up right after the act which gave the State the right to select in here and that way, any time we give something up, a hole appears and the State—and I don't know how the State feels about the area now. I think it's important in looking at the Kandik withdrawal, are these watershed lines right in through here, because as you can see, this area relates into the Yukon down here. This area has north flowing streams that flow into the Porcupine or—some salmon, trout and these types, that flow into the Porcupine, so I'll discuss that when we get to the area—the wildlife records. In the lower Kandik, the Ogilvies are right along the border here and we have zinc, zinc, zinc, zinc, zinc/lead.

Mr. HARVEY. I would note for the record that every time he's stuttering, he's referring to separate indications.

Mr. WILLIAMS. Well, on this one, I'll give you a number of commodities. They're all on one cross section. Zinc, lead, silver, uranium, and down in here, zinc, copper, and moly. It would be conceivable to come out of the Kandik through Circle, but we would have to cross some pretty good little ranges that divide the Charley Creek and the Kandik River from the Black River watershed and the range that divides the Nation and the Kandik watershed. There are probably two routes out. We can go back through Canada or somehow we come south, and I'll leave that at that.

Other things of interest, the Canadians—and I'm sure the oil and gas people will cover it more. The Canadians drilled some wells up here and they got some interesting information. In this area, we've found some structures that are interesting. Yes, I'll give you—the committee maps of all of this later, if I may.

Mr. Harvey. Very good. Any more comments on the State and Native selections? Yes?

Mr. Hession. A question for Mr. Williams. I understand that Doyon has overselected perhaps up to 100 percent. Can you give us an idea of what you intentions are in the Charley River drainage? For example, do you intend to finally select all of that or part of it or what?

Mr. Williams. That's an awful rumor. We're not overselected 100 percent. We are overselected. No; I can't give you any indication, because we really don't know. We change daily, as information comes in and as strategies develop. For instance, in this area, if worse came to worse, if we had to—under section 603 of the FLPMA which I don't really want to get into, it might be that we would retain all of these lands just to give us a transportation corridor. It might be in a number of areas in the Kandik, that we would retain much land just for a transportation corridor, if we could not obtain transportation corridors or rights-of-way from the Federal Government or from the State Government. We don't know. A lot of it depends upon the outcome of what we're doing here right now. A lot of it depends on what happens with section 603 of FLPMA. So we're in a position that we roll with the punches, and I could kind of give you an indication today of where we stand, but 3 months from now, it would be different.

Mr. Harvey. Thank you. I'll note for the record here that when he says FLPMA, he's referring to the Federal Lands Policy and Management Act of 1976.

Are there any other comments? Yes?

Mr. Wickes. Yes. Jim Wickes, Department of Natural Resources. In terms of State lands within the Andrus proposal for the Yukon-Charley, our figures indicate there are 370,000 acres, most of which is to the north of the river in the Kandik Basin, as Mr. Williams pointed out. I should also point out that there are eight townships south of the Yukon River in the Charley Basin that the State has selected, but the Department of Interior has some questions about them and the legitimacy of those selections have yet to be resolved. In terms of State selection interest in the area, the State has identified some 670,000 acres primarily for the renewable resource values I described earlier, and these areas pretty much come down from Circle and follow the Yukon River for a ways. The combination of moderate agricultural potential, of fair to moderate forestry potential and the land capability values make this particularly attractive on a statewide basis, and it is the statewide framework that we're looking at in choosing these selection interest areas, so our selection interest in the area is, to a certain extent, an emphasis that there are these values there and that on a statewide basis, they are significant and hence our identification of these areas. In terms of Native selections, Mr. Williams generally pointed out where they are. Our figures indicate that estimated final native holdings within the Andrus boundaries would come to some 250,000 acres. Thank you.

Mr. HARVEY. Any other comments on the land selections and land use? We've already had some comments on the private use in the area. Let's go ahead, then, and pick up the energy resource values in the area and AOGA is right here.

Energy Resources

Mr. HARTMAN. I'm Don Hartman, for the Alaska Oil and Gas Association. The northeastern 1½ million acres that the Yukon Charley River Preserve area lapped over onto the southern portion of the Kandik Basin. This is a major sedimentary basin, outcrops on the southern part of the basin have been measured as over 36,000 feet, of sediments ranging from pre-Cambrian, through Paleozoic, Mesozoic, and Tertiary age and a number of the different formations are oil bearing. There are extensive oil shale outcrops in the vicinity of—well, between Eagle and Mason, along the Yukon River. These are bituminous in nature. When I was there in 1970, I observed some of these shales burning for over 1 week after being ignited by a small forest fire. And there are also some shows of oil in various limestones in other parts of this section. The only test drilling that's been done in the Kandik Basin is to the north of the preserve. Louisiana Land and Exploration, working with Doyon, drilled their No. 1 well just to the north of the preserve area. It was unsuccessful, but I would like to point out that there are still several very prospective structures that have been untested and that lie partially or wholly within the preserve outlines. As Mr. Williams mentioned, a short distance to the east in Canada, there was at least one well drilled about 17 years ago that had produceable gas and condensates and this area is within part of the basin that I'm talking about here.

Mr. HARVEY. OK. Any other comments on the energy resource values?

Mr. BARKER. Jim Barker, Bureau of Mines. The tertiary sediments lying south of the Yukon River, between Yukon and the Seventy Mile drainage, are known to contain coal, unmeasured and untested at this time. About all we can say is that there is coal there. Some of the outcrops along the Yukon River have been utilized in the past by the residents and others traveling up and down the Yukon. Mr. Hartman mentioned oil shale. There is also a uranium potential in these sediments in the same area I just mentioned, and perhaps in association with some of the older sediments in the wedge on the northeast corner of the withdrawal.

Mr. HARVEY. Good. Any other comments on energy resources?

Mr. HARTMAN. One more thing. Don Hartman, from AOGA. My pitch is that we want to have access to this area along—around the Yukon for geological exploration and even drilling, if that should appear warranted.

Mr. HARVEY. Yes? Other hydroelectric comments? Why don't you do that, just make a brief comment here?

Mr. STENMARK. Richard Stenmark, Land Use Planning Commission. This area along the Yukon contains one of what the Alaska Power Administration has rated one of the five major hydroelectric sites in Alaska, with the dam site in the Woodchopper area here, which would back a reservoir back up into Canada past Eagle.

Mr. HARVEY. Thank you, Dick. We will get from the Alaska Power Administration, if we don't already have it, their evaluation of each of these major sites. Anybody else have any comments?

Mr. WICKES. Yes, Mr. Chairman. Jim Wickes, Department of Natural Resources. In terms of oil and gas potential, roughly 700,000 acres of the Kandik Basin overlap with Mr. Andrus' proposal, 500,000 acres of which fall in the fifth and sixth levels on a statewide rating. In terms of coal, there are small coal outcrops in the area. They are rated by our system as relatively low, but they're relatively unknown in nature. In terms of uranium, sedimentary deposits in the area again are relatively unexplored. Our assessment indicates that in the second level of goodness with respect to uranium, roughly 59,000 acres can be found. The rest is highly speculative at this point.

Mr. GORDON. To go on on the State computer, according to the data I have, Jim mentioned the uranium, which is 0.66 percent of the State's potential in the top two-fifths of the rating. In terms of coal, in the top 40 percent, zero. In terms of oil and gas, in the top 30 percent, zero.

Mr. HARVEY. Thank you. Yes?

Mr. WILLIAMS. Dave Williams, Doyon. That's right on a statewide basis. That may be right on a statewide basis. Locally and to local industry, which we would like to consider ourselves as being, these can be exceptionally important and I don't think that that can be overlooked when you're looking at 375 million acres. That something may be darned unimportant Statewide may be, because of its strategic location, darned important in the areas that exist.

Mr. HARVEY. Yes?

Mr. FANKHAUSER. Bob Fankhauser, Alaska Miner's. I'd like to reinforce that point also. Each time we go through these things, there's 1 percent or less of the total mineral potential or whatever, and statistically it sounds very small, but once again we're dealing, in finding a resource, you need to have lots of areas to look at and the actual mineral that is produced is very, very small acreagewise. Thank you.

Mr. HARVEY. Any other comments on the energy resources? All right. Let's get into the hard rock. Go ahead.

Nonfuel Mineral Resources

Mr. BARKER. Jim Barker, Bureau of Mines speaking: first, on behalf of Carol Allison and the fossil values on the Kandik. She asked that I explain a little bit about what they are. They are of considerable academic and research interest. She has completed quite a bit of work that's been of value for mineral resource studies. However, these are microfossils. In terms of legal protection that might be applied to them, they're not the type of fossils that the weekend rockhound would be interested in or would even be able to find.

Moving on to hard rock minerals, first, again the wedge along the northeastern portion of the withdrawal we have rated as having a very high potential. I have some X's on my map, which I will submit to you. This is the result of intermittent field work over the last 2 years. These are mineral occurrences in quite a few different places from those shown on Dave Williams' map. I think it shows that the area has a high potential and that if one looks, he can find occurrences of mineralization. These are not only in the uplands. We've found occurrences of zinc mineralization right down along the Yukon River. Also in this area there are extensive beds of hematitic iron, redbeds. We have some assays from them, as much as about 33 percent iron. These are not economic at this time, nor will probably be for some time, but they do represent a future resource.

Another area of Paleozoic sedimentary rock is further down the Yukon River towards Circle. It's a rather extensive area that comes in from the northeast. An example of the mineralization that may be found there is the occurrences of lead barite and copper we examined this past summer, about 20 miles southeast of Circle. There are gold places known at Gold Creek, Woodchopper Creek, Fourth of July Creek and a number of other smaller drainages to the Yukon River. In the Gold Creek area, there has been 200,000 ounces of gold produced. Last year, the dredge was rejuvenated on Gold Creek and 25 people were employed there. We conducted a pan concentrate survey of that entire region and found that a number of creeks that contain placer gold that haven't even been reported yet, let alone mined. We've also found evidence that significant placer mineralization may exist along the Charley River, itself, on the lower third. I'll submit this map to you as part of our evidence that we have prepared. A little further to the southeast along the 70-mile drainage, 230,000 ounces of gold have been produced. Several people are currently seasonally employed there. On the upper Charley river, on the south side of the Tintina Fault, we are into the metamorphic and granitic terrain of the Tanana Uplands. There are a number of deposit types that may be potentially valuable. We examined some pegmatite bodies that contained traces of such elements as tin, lithium and other minerals associated with that type of deposit. There is one area that we have identified as being highly favorable for mineralization. It extends along the south fork of Birch Creek, eastward and northeastward and takes in the western side of the Charley River. In this area, among the different types of deposits, both contact and stratabound deposits seem feasible.

We examined an occurrence on the north side of the south fork of Birch Creek where zinc and molybdenum mineralization was identified. Tungsten mineralization is known on Caribou Creek. We found an area in the vicinity of Bend Mountain on the west side of Charley River to be highly anomalous in tungsten and uranium. There is a potential also for contact type deposits on the Copper Creek tributary of the Charley River, a little bit south of this area. I think that's all I have.

Mr. Jones. This is David Jones of the National Park Service. In 1977, the National Park Service contracted with David Piper & Associates, mining industry consultants in Butte, Mont., to make an estimate on the market value of the known mineral interests, and they examined 60 claims which involve 4.7 linear miles of placer channel and 207 acres of lodes. The estimated market value was $321,000.

Mr. Harvey. And this is within the boundaries of the Morton proposal?

Mr. Jones. Within the boundaries of the Morton proposal and on the definition of market value that I've previously given through the testimony here.

Mr. Harvey. Yes. Thank you. Jules?

Mr. Tileston. A question, just for clarification. I assume that was Woodchopper and Gold Creek, since that's where the basic area of placer is located?

Mr. Jones. It must be. I don't know. I've never been there.

Mr. Harvey. Any other comments on the hard rock? Yes, go ahead.

Mr. Wickes. Yes; a couple of brief remarks. I'm Jim Wickes, Department of Natural Resources. Again, the statewide perspective indicates that some 150,000 acres within the Andrus Yukon Charley proposal fall in the third and fourth 10 percentiles on a statewide basis. Thank you.

Mr. Harvey. Yes, go ahead.

Mr. Blakested. I'm Rod Blakested again, here speaking for the Alaska Miner's Association. I've had an opportunity twice today to speak and on both of those occasions, I was not prepared, but this time I am. First of all, I have a couple of general comments. I'd like to state that this computer printout thing that the State is always referring to, whenever they don't have any data on a particular area, regardless of its potential to somebody like myself or a company that I work for, if it has no known potential, then it goes in as a big zero, no known potential for the State people. However, there are lots of people working in the State whose jobs are related to the mineral industry, who might not view the same tract of ground as the State computer does in the same light.

I would like to say that I take exception to a lot of the potential percentiles that we're hearing popped out by these State people, with all due respect to Mr. Wickes and all the work that they've done to put this together. I don't think it's really fair, and I'd just like to go down on record to say that there are many people in the industry who also do not think it is a fair evaluation of the mineral potential. Now, in turn our attention to the Charley Yukon River area, first of all, I would like to go over a couple of concepts that we use in the exploration business. One of these concepts deals with the law of superposition, which is a law that was put out or was brought forth by a man named Mr. Hutton, an English geologist of some reknown that was in operation some 100 years ago. But this very simple idea is one that layered rocks or sedimentary rocks are laid down on a—in a time stratigraphic sequence such that the oldest rocks are laid down first, with the next oldest rocks on top of them, all the way up to the youngest rocks; and in the business of mineral exploration, this idea of stratigraphic age relationships is very, very important. Take, for instance, in a basin of some aerial extent. Let's just say, let's just take, for instance, the Cook Inlet Basin. Today, there are sediments being laid down on the southern portion of the Cook Inlet Basin that are the same age and the same and similar type as those sediments that are being laid down on the northern side of the Cook Inlet Basin. Well, taking this one very brief example and projecting it back in geologic history, then, let's go back to the Cambrian time, which is about 500 to 600 million years ago.

During that period, this portion of the Charley River or of the Kandik Basin, the Nation River and this portion of the area of interest, was a large basin that extended way over here into the Yukon Territory. During that period, this one big basin was receiving all kinds of sediments, some of which were highly mineralized, and in the Canadian area, in the Yukon Territories where their exploration activities are much more advanced than they are here in Alaska, they have found a number of very exciting high-grade lead/zinc deposits that were deposited in these sediments in that basin back those hundreds of millions of years ago. So those same basins and those same sediments existed right here in this portion of this area of interest. This is just outside of the actual Yukon Charley River withdrawal, but it is within the area of ecological concern, as was pointed out in the environmental impact statement that was developed for this area. But what I'm trying to point out is that the sediments that are in this area, just using this as one example, are known to have lead/zinc deposits very similar to those that are found in the Yukon Territory. Now, I'd like to expand from that 500 million to 600 million year ago period, right up to the present time. We've heard earlier testimony by some individuals that said that we have one of the best exposures of stratified or layered rocks, and he said, in all of the world with fossil content, exposed in this area and that's very true. The Nation River area has got rocks from pre-Cambrian, that's greater than 600 million years ago, almost continuously up to the present time; and, of course, these rocks are being laid down, eroded, and sediments are being laid down there every year. There's going to be more there this year, but there is a whole sequence of time that's being laid down and is laid out before us in these rocks, and they've been studied by several USGS groups and several of the U.S. Bureau of Mines groups, and there have been several studies done by private individuals and private companies.

I represent one of the small studies that's been done in this area. A company that I worked for a few years ago, working in Canada, found iron deposits which I have marked there in the upper Timber River Basin and also one which has already been mentioned down here on the Tatonduk River, right very close to the border. Well, this Canadian company that I am referring to that did this work over there has determined that there is an extensive area of iron ore—or not iron ore, but there is an extensive area of iron mineralization in this vicinity, the extent of which is still unknown, because we haven't had time to go in and evaluate the given deposits that are there. Neither the USGS, Bureau of Mines, nor private industry has ventured into these areas to give a very serious look at this, although the outcrops that we do see of several hundred feet thick, running anywhere between 10 and 15 or 25 percent soluble iron, it's not economic at today's market, with today's prices and the technology available to the mining industry to extract these metals at this time. However, it does point out the potential, which would probably be zero on the computer printout, but the potential for there being an iron deposit of economic tenor or economic grade in this area still remains high, because we don't know anything about it. We know very little about it. Also in addition to the lead, the zinc, and the iron mineralization which I've pointed out in these two particular cases, Mr. Hartman has pointed out the oil shales in this unit called the Glenn—I think it's the Glenn formation, is produced on—represented on this map by published USGS data, by these dark areas, these areas in black here, which again I will submit this map to the panel for their use. But this black area indicates the areas, and the lower couple of hundred feet of this particular unit is the oil-bearing shale unit, and there have been a couple of studies done on these things, very, very meager studies that indicate that you can get up to about 30—up to 30 gallons of liquid petroleum from the retorting of these oil shales. I would like to point out that this particular basin—this particular rock unit, another one of these stratified units which I was speaking of as being of Cretaceous to Triassic age, goes right through the Charley River, which is here, and right to the Yukon withdrawal area. Also the Kandik Basin area, which extends further to the north, as other outcroppings of these particular oil-bearing shales. I have had the opportunity to visit some of these shales in this area and there is somewhat dramatic—maybe this does't really mean that much, but there is oil actually seeping out of the ground in some of these cases, from the oil that is contained within these shales.

Now, in addition to the stratified mineralization which we see very well exposed in these rocks north of the Tintina Fault, the Tintina Fault is a very major crustal fault or crustal break which is indicated on this map by this dark line coming right through the interest, these stratified rocks lie to the north of that. To the south of this lie a very complex area of crystalline rocks, and the second idea that I would like to propose today is one that, again, we used extensively in our concept of exploration geology, and that is that all of the landforms in the world today were formed by some process, and the major landforms which make the continents rise above the sea and make the deep sea trenches go down where they are and what not, are derived from a very involved theory called the plate techtonic theory, the plate techtonics is now becoming very important in our concept of mineral exploration and where one might be able to find what type of minerals and where one might be able to find certain trends. We find that on the edges of all the continents, there are certain belts that are developed that tend to run parallel to certain boundaries on the continental crust. The Tintina Fault is thought to be of Paleozoic or a Paleo continental boundary.

On the south of this area, we have an continental terrain that was laid down through the hundreds of millions of years of its existence, on top of old oceanic crust and whenever the interaction between these plates occurs and you get these belts of similar types of mineralization or I should say similar types of geology, which tends to allow a similar type of mineralizing process to occur, these things form in belts and I'm sure most of you that are familiar with the work that's been done by the USGS and the Bureau of Mines and other Government agencies tend to show these belts as metallogenic provinces, if you like, or big, broad, generally thin, but long linear structures or areas which enclose certain types of mineral deposits. Again, referring to—specifically to our area of interest, that area to the south of the Tintina Fault is very highly mineralized, as has been brought forth by several of the people giving testimony earlier today. On my map here, I have outlined several areas in dark green which you can see possibly form the back of the room as just being little green blobs. Well, these green blobs indicate areas of ultramathic rocks. An ultramathic rock is one that's very high in iron and magnesium and other ferrous types of minerals. These ultramathic rocks, I believe, play a very important role in controlling some of the mineralization which we see in this district. In addition to these mathic rock outcrops which I have on the map, I have put down the areas of known gold placer mineralization, and these are indicated on this map by yellow. You can see the Forty Mile area, which I spoke of very briefly earlier today. You can see the area around Eagle, a few creeks in this area here, American Creek, the Crooked Creek area, just up to the northwest of there, lying along the Tintina Fault zone. You can see Blue Creek, an active—a former active gold placer area. You can see the Fourth of July Creek. It drains into the Nation area, and you can see the Gold Creek and Woodchopper Creek area, which is right up here.

All of these areas tend to fall very close to the Tintina Fault. As well as that, we can go up here to the Circle Hot Springs District or the Hot Springs District, which is a major producer and has a very long history of mining in Alaska.

Again, what I would like to point out is that we tend to find certain types of mineral deposits that are parallel to former plate boundaries, and this plate—this being a former plate boundary, indicates that this zone that continues on up to the northwest and even swings around into central and southwestern Alaska, has been a major gold producer in the past and there is no reason to believe that it won't be a major producer in the future. It's true that a lot of the placer gold has been taken out here, but the source of this placer gold has not been found and from all geological evidence and indications, the source of that gold is still there and there will be, as technology advances, as geologists learn more and more about the geochemistry of gold, there will be new people, people younger than myself coming in with new ideas to explore this area and look for where that gold came from. It came from a fairly local source. I have a few ideas of my own. I think that, quite likely, a lot of this gold came from these ultramathic bodies. That's one of the reasons why I put these things down. In addition to the gold possibilities of these ultramathic bodies, we, of course, have heard about the asbestos occurrence that the Doyon's are trying to develop down in this area here, and in addition to the ultramathic as being the source of gold, there are known volcanic rocks in this area and very large areas of intrusive rocks.

Now, turning away from the gold for a moment and looking at other resource potential in the area, the U.S. Geological Survey has done a fairly extensive stream sediment survey where they go into an area and they pick up a little bit of stream sediment and analyze the metallic components of that stream sediment and plot that on a map. When you plot these things by element on a map, then you can tell which areas, by their streams, contain a higher amount of metals in that stream, indicating that the rocks that are eroding into those streams contain a higher particular type of metal. Well, I've taken the data from the U.S. Geological Survey and just have used this portion here, because it pertains to the Charley River withdrawal, because it again is on this parallel trend that goes right up through the area of interest and I've plotted these things and taken out only those high values, the values that we consider in the industry as being anomalous. Anomalous values, again, this is a compter or a statistical manipulation, and what is an anomaly to me may not be an anomaly to somebody else. But I have filitered this at what I would consider a fairly high level, because I've taken even the U.S. Geological Survey anomalies and filtered them even more so, using a higher cutoff level, and have plotted these stream sediments for the Eagle Quadrangle, which is this area right here. We have—I have not available to me any data for the Charley River Quadrangle and very little for the circle and nothing for the Big Delta Quadrangle, except for a little bit of industry information which is privileged, but I do intend to show some of these geochemical anomalies in these areas that are presently blank, for the edification of our board members here.

What I would like to point out, though, is from the study of this U.S. Geological Survey geochemical data, I have been able to determine that there is a very large area of zinc and copper anomalies, which are indicated by red and green on this particular map, which trend up into an area of high lead, silver anomalies in this area in here, with scattered zinc or scattered copper anomaly. In addition, we find a few scattered gold anomalies, which again are indicated by yellow in this area, and again using some subjective reasoning here, there is all reason to believe that this particular high metal area trends right up into the Charley River area and so I think that with a greater distribution of stream sediment samples, we would find that this area does contain high mineralization, as we have found in industry to be the case here in the Circle Quadrangle just on the western side of the area of interest.

Smack dab in the middle of the Charley River area, here on Copper Creek, we do also have a number of copper anomalies, some silver anomalies, and some tin/tungsten anomalies, which are right square in the center of the area of interest, and also there is an old known copper, silver, gold, tungsten, bismuth, and zinc zone of mineralization that has been referred in the literature since as early as, I think, about 1915 or 1917, if I'm not mistaken. That's right on Copper Creek. In addition to this, we find that down the southern area of interest, we have copper anomalies, some zinc anomalies, and a few tin and tungsten anomalies in this southeastern area of interest, and also I might point out that the U.S. Geological Survey data indicates that there is a very large area right in here of high tin and with a few tungsten values and high lead values in their stream sediment survey; however, that data, upon my filtering of this area, did not hold up because my anomalous level criteria was higher than that used by the USGS. But in their data, they did indicate that this is definitely a tin and a lead province.

The likelihood of finding an economic concentration of tin or lead in that area is fairly high. I think that pretty much covers most of what I'd like to say, with the exception of one thing, and that is the placer mining again. The areas of active placer mining within the withdrawal area at the present time is Woodchopper Creek and Coal Creek. I believe there's still some activity on the Fourth of July Creek, which is right here, and in the vicinity of Eagle. I would just like to reiterate the fact that there are people presently in there mining and trying to make a subsistence living off of the land without disturbing so much the wildlife and stuff like this. But there are people that are presently working in that area who have prior rights again, in that they were there before the enactment of the Alaska Native Land Claims Settlement Act and still operating under the laws and the Constitution of the United States of America. I think this is pretty much all I can say, just off the cuff like this, but I will be submitting this data in some detail at a later time. I thank you for your patience.

Mr. HARVEY. Thank you. Yes?

Mr. BARKER. Jim Barker, Bureau of Mines, again. I, inadvertently, didn't mention that in some of the ultramafic southern portion of the Charley River Quadrangle, preliminary geochemical data indicates high backgrounds. The data will be included in a report we're preparing on the Tanana Uplands area, which will be available in a few months.

Mr. HARVEY. Any other comments with regard to hard-rock minerals? Yes, sir?

Mr. GORDON. OK. Well, I'll continue with the information that is very incomplete. I think the record should show that the State computer indicates the amount of minerals in the top two percentiles, the top 20 percent, is zero. And also I think it might be useful if Bill Brown would be willing to briefly explain the concepts we're including in the Woodchopper/Coal Creek gold mining area within the parks proposal.

Mr. BROWN. At the present time, the mining activities, as was just pointed out, on the Fourth of July, Coal and Woodchopper are—and I believe people would question this, but I will say it anyway. They are phaseout activities. The work on the placers has gone on for many years in these areas, and it's not exactly a major strike situation. Things are phasing out, and the low level of mining now occurring—I'm talking about placer mining and none of the others—is such that it is somewhat reminiscent of the historical mining activity that's gone on there for a long time, and this would be part of that historical environment.

Mr. HARVEY. Would that mining be able to continue if the Woodchopper Dam was built?

Mr. BROWN. Oh, no, no, because that would split it into the areas.

Mr. HARVEY. Any other comments on the hard rock?

Mr. MORGRIDGE. Mr. Chairman, Dean Morgridge, Alaska Oil and Gas Association. I would just like to comment on the gold operation on Coal Creek. I had an opportunity to visit that this last summer. Believe me, it is not being phased out. That is a very active operation.

Mr. BROWN. I didn't say it was being phased out, sir. I said it is a phaseout down trend. That is what I meant. It is not being phased out. They're going back over areas that couldn't be reached by the dredges.

Mr. MORGRIDGE. Well, that's right, they're going over areas that couldn't be reached by the dredges and they're also reactivating that dredge, and they have a very large volume of gravel that is available for working in there—and that's a real going operation.

Mr. HARVEY. Thank you. Yes, Chuck?

Mr. HAWLEY. Yes. Mr. Chairman, Chuck Hawley. The comments are true that the—they have drilled reserves and they have ground which is prospective, which has not been drilled, but which is known because of old tests to be gold-bearing. So the reserves are—any mining operation by definition is a declining operation, but unless you've learned something that we haven't—they do have quite a few years in front of them and the change in the price of gold has made the operation possibly economic.

I have a question that might get into policy, but in the Mining and the Parks Act, it sounds to me like it says that there's no surface mining. Is placer mining, by definition, considered to be surface mining? And even though they say that mining will be allowed, we're also familiar with mining that's supposed to have been allowed in Glacier Bay and the—I would like to have that question answered, if possible.

Mr. HARVEY. Well, I'm not sure I can answer the question. The Mining and the Parks Act, though, would only apply to those areas where mining claim location had been allowed in the past. Congress has now said that we aren't going to allow mining claims to be located in the parks in the future.

Mr. HAWLEY. OK. But the regulations drawn subsequent to the Mining and Parks Act sound like they preclude surface mining and if placer mining is, in fact, surface mining, it looks like it's precluded by the regulations. So they can say that mining will be allowed, but I don't believe it will.

Mr. HARVEY. The law is fairly specific about being able to expand existing mining areas, and some of the mines that were being considered, such as those in Death Valley, were very definitely surface mines. They were open pits. But there is a limitation, you're right. Your question is a good one, but it's really not applicable, because I don't believe that the Congress, in creating new parks in Alasks, is going to apply the Mining Law of 1872 in those parks.

Mr. HAWLEY. Right; I understand.

Mr. HARVEY. I think that would be very surprising.

Mr. BARKER. In regard to remaining placer reserves, as I stated, in the Forty Mile, our studies indicated that roughly three times more gold still exists in known placer grounds than has ever been mined out of that region, and that is just the gold that's in the known deposits. There are extensive high-level bench placer deposits also along the Forty Mile and along the Seventy Mile. I mentioned along the lower Charley River that our geochemical work has indicated a much more extensive area of gold placer to exist than has ever been really considered in the past, so I think in summary, the best we can say is that they've hardly scratched the surface. It's not really defined yet.

Mr. HARVEY. Any more comments on the hard rock mining? Ben?

Mr. SHANE. Ben Shane, Alaska Coalition. The Bureau of Mines has published a study which deals with this part of Alaska, that might help us answer some questions of a broader scope dealing with mining than we've been hearing in the last couple of days. The question is, why is there mining in other parts of the world that exhibits the same geologic structure and the same northern latitudes as Alaska, while Alaska does not have the major mining industry at the present time? The Bureau of Mines introduction—the name of the Bureau of Mines study is "Comparative Asbestos Mining and Processing Costs of Alaska versus Yukon Territory." This study is a couple of years old now. The introduction of the study states that during the past 10 years, revenues in the Yukon Territory from hard rock mining have increased nearly tenfold, to $150 million, while revenues from hard rock mining in Alaska have declined to approximately $2 million per year. With the geology of the two areas being very, very similar and the accessibility of the two areas being equally developed, one may then ask if the difference in development is not due to a difference of cost? The conclusions of the study develop comparative cost estimates for two asbestos mining operations. One site is the Clinton Creek Mine in the Yukon Territory, located about 25 miles southeast of Eagle.

Mr. HARVEY. Go ahead. I would note, the committee has the study.

Mr. SHANE. It has the study?

Mr. HARVEY. It was completed 2 years ago.

Mr. SHANE. And the other one is the known asbestos deposit. The difference in cost between the two sites is 32 percent and if you extrapolate out the price required for asbestos, to be mined economically, you find that the Canadian deposit is just about at the margin, whereas the Alaskan deposit is far uneconomical. The basis reason for the difference in cost is not due to transportation. It's due to labor and one would conclude that it's relatively deep-seated in the Alaskan economy.

Mr. HARVEY. Thank you. I'm going to move on to access and transportation. We've got about 7 minutes left on this tape. So are there any specific comments in that area? Yes?

Transportation and Access

Mr. FANKHAUSER. Bob Fankhauser, Alaska Miners. I'd just like to point out one thing on transportation here. We've talked a lot about these mineralized belts, which are fairly extensive and this sort of thing, but the point being is that within these entire belts, there may only be a few deposits that are going to be able to be mined economically and we're not talking about mass devastations of these higher belts or this sort of thing, but the point is, indeed, to be able to refine that information and to find the mineral deposits that would be economic. The economics of these things change daily with price increases and not only that, but land situations, access, Government taxes and so forth. The economics today, as we mentioned, there is no Alaska mining industry, as such. But these, hopefully, might change in the future and I would like the Commission to please try to remember that access is the key to getting anything out of Alaska or anywhere else and that the Yukon River has been a major transportation access for many years, for many people, for many different things, and I certainly wish that somehow or other legislation be instituted that would allow the exception, and an economic mineral deposit is an exception. It's a very freak of nature, if you will, to allow concentrations of metals in one local place to be high enough grade to make it economical to overcome all the costs. Thank you.

Mr. HARVEY. Thank you. Are there any other comments on this? Yes?

Mr. THOMAS. Yes. Bob Thomas, Department of Transportation. Several years ago, we had identified several corridors through this area that we've been talking about this morning and subsequently dropped those corridors for several reasons. Probably mainly is that it's very difficult, as we found out this morning, to find out exactly where they should go in order to serve the mining industry and also probably because of the rugged individuals or the miners, they don't gripe a lot.

Mr. HARVEY. You're referring to highway corridors, road corridors?

Mr. THOMAS. Yes, overland corridors.

Mr. HARVEY. All right.

Mr. THOMAS. I also would like to reiterate what Bob just said about the Yukon River, that that has been a transportation corridor ever since mankind and while it may not be used extensively, it can be and I'm sure in the future, we'll be seeing a lot more use of that Yukon River. Our corridors at this time have pretty well been refined to a point where they're just serving the people needs and not the mining needs at this point.

Mr. HARVEY. Yes?

Mr. CONTOR. Roger Contor, National Parks Service. I think we should just state that there's no intention of the administration to preclude any commercial transportation along the river. That would remain.

Mr. HARVEY. Yes; that's true.

Mr. TILESTON. Two things. In terms of resource potential, as such, for pipeline industry, Alaskan Arctic Gas and the consortium did identify a corridor that comes down through this area, and Doyon mentioned the need for a potential access, and there is one way of where topography as a resource—it was not selected, but at least it gives you an idea of when—where one might go. We do have some conflicts coming up. I think they're real and they're significant, when you get into the Charley River. There is now motorized access in the lower areas, well above—below one-third, basically for sport hunting, however, you can find evidence of people who want to go sheep hunting, if they go all the way up to the sheep bluffs, that's almost 60 miles upstream. You really beat your boat to do it, but that's upstream movement where we're talking about a recreation resource, which is nonpowered and downstream, and this river does not have the capability to handle boat uses safely. You also have a real problem in access in terms of recreation. The river, itself, and its environment are relatively small. It's a very intimate association. The only access that you can reasonably get into the air—into it is by air. The motors, the landing facilities, create an intrusion which impacts the entire area.

Mr. HARVEY. Thank you.

Mr. WILLIAMS. OK. I don't know if I said it as well as I should have, so I would just like to restate that our concern is access to Native lands. I did mention that we could possibly go up the Kandik or the Nation and out through Canada, and that's pretty unpragmatic really, because we've got to go then across the entire Ogilvie Mountain Range and I think the most spectacular portion of the Ogilvies are on the Canadian side. I think I have to put into the record, too, that the—I'm rather dismayed to find out that our asbestos deposit isn't as good as we thought. We started with BLM's study and on the basis of more recent data, I think that it's a lot more favorable than was given.

Mr. HARVEY. Any other comments on access? Yes; this gentleman right there.

Mr. SCHAFF. Ross Schaff, State geologist. There are several people in this room who spent about 3 days working with the office of technology assessment to identify specific problems of access to non-Federal lands, as a consequence of the various (d)(2) legislations. I don't know. That's Frank Brabb's project, I believe, or Bill Davis. That report, I don't believe, has come out yet. The committee may or may not be aware of that.

Mr. HARVEY. We have it. Yes?

Mr. BISHOP. Dick Bishop, Department of Fish and Game. On the question of access to the Charley River, I think that perhaps the point is the quantity rather than the type. The degree to which outboard powered boats can be used in there is fairly limited by the conditions of the river and there are probably only a handful of people that are willing to risk the damage involved and generally they incur some of that damage, anyway, so I think the—perhaps the important consideration is the quantity of use, rather than necessarily the kind of use. Up to this point, I don't believe that the motorized traffic has been a particular problem in that area, from the standpoint of either—well, from the standpoint of most of the resources involved.

Mr. HARVEY. Any further comments? Jules?

Mr. TILESTON. Just a point of clarification. I agree exactly with what was said a minute ago. What I'm talking about, though, is in the long range, the concepts that are going to develop. Right now, the only access is almost literally by helicopter, which restricts it to very few people.

AFTERNOON SESSION

Mr. **Harvey**. The workshop will come to order. I have a couple of announcements. First of all, some of you were asking about our address. It's simply the Committee on Energy and Natural Resources, U.S. Senate, Washington, D.C. 20510, and if you're submitting material for the record, you might want to mark it as for material for the record on (d)(2) workshops. Two other things that I should note, that we have accepted a number of submissions from people that we literally do not have the physical capability to print in our committee document that will be the result of this. That material will be kept in our files and it will be referenced in the print, such as some maps, for example, will be referenced in the committee print that there is a map available in our files, so that if someone wants to get at it, they can.

YUKON FLATS

Mr. **Stenmark**. Richard Stenmark, Land Use Planning Commission. First, we want to address the Yukon Flats area, and included within this, then, address the Beaver Creek, White Mountain area, Birch Creek, and also the stretch of the Yukon River from Stevens Village on down to Tanana in that corridor. Coming north up to the crest of the mountains here at the head of the Hodzana River, on across the Porcupine Drainage in here, and I would expect some overlap in this area of the Porcupine is probably appropriate. But after that, then, we'll be getting on into the proposed Arctic Wildlife Range additions of more or less the Quinhagak, Colleen and into the Brooks Range proper.

Mr. **Harvey**. Thank you, Dick. We'll start off with comments on the scenic, landscape, historical and archeological values, including wild and scenic river values. We will, incidentally, as part of this, take any comments anyone wishes to make on both Birch Creek and Beaver Creek wild river proposals. Does somebody want to lead off? Go ahead.

Scenic, Landscape, Historic, and Archeological Values

Mr. **Dapkus**. Dave Dapkus, Heritage Conservation and Recreation Service. Three rivers I'd like to talk about, the first is the Porcupine. Again, it's an international river, roughly 400 miles long, of which 250 are in Canada. The Porcupine is a good floating river, good recreational values. It's an easy float for anyone in a canoe. The main thing it's noted for, as you see some of the other values there, one of the big ones is the scenery. The canyons in the Rampart section of the Porcupine have 500-foot high walls and are brightly colored with golds and reds and greens and blacks. This scenery is very interesting and different from other rivers. Along these same bluffs, the wildlife comes into the picture, with nesting habitat for various raptors, and another thing that you see on the Porcupine that's very interesting is its history, and to make a real brief point there, the Hudson Bay Co., way back in our history at one time, wanted to take that part of Alaska and make it into Canada and so they had a post down there and we Americans pushed them out. They went back a little bit further into Rampart and Old Rampart. They probably moved three times until we got them back into Canada, but anyway this history is there for all to see. As you're floating down the river, there are cabins that are still there and this makes the Porcupine very valuable from a recreation standpoint and a historic standpoint.

Now, let's jump over into Birch Creek, with the emphasis on Birch Creek being that it's road accessible. I've mentioned over the past few days about three rivers that are road accessible. The proposal is road accessible at the upper end and down 135 miles on the highway to Circle. It's an excellent family floating stream, high recreational values, mostly class one water with some class two, and it's just got generally good fish and wildlife values, good grayling fishing and there's some known peregrine falcon nests along the area. Real briefly, over to Beaver Creek, Beaver Creek is not road accessible. Its values are, again, recreation. It's a good family float, it's an easy float, it's highly scenic, particularly in the big bend areas, you wind around the White Mountains and the river sits right next to them. Other recreational uses, there are several trails that come into Beaver Creek from the roads, from the roads out of Fairbanks. BLM has a recreation cabin there that lays right on the banks in the big bend area. It's highly used both winter and summer, by hikers in summer, snowmobilers in the winter. And again, it's highly scenic. Both these rivers, the proposals are outside the Yukon Flats, but the rivers, themselves, eventually flow into the Flats. That's it. Thank you.

Mr. HARVEY. Are there any other comments on the scenic? Yes, go ahead.

Mr. REFFALT. As the name implies, the Yukon Flats are a large flat area. The basin, itself, is about 10 million acres that contains the general Yukon Flats, as they're normally titled. It is what we refer to as a solar basin, lying essentially rimmed by low hills on nearly all sides. In that way, the solar basin effect is very important biologically, and I'll leave that for the wildlife part of it.

The general scenery within the Yukon Flats, unless you're a duck or a moose or a martin or something, probably is again monotonous as you would find on the Yukon Delta. It is a forested area. There is not a great deal of relief, except on the ground, as I say, and therefore as you fly over the area, you do get a sense of monotony to it. But it is a vast area that, in and of itself, is unique. It's just that you could take it in smaller doses probably.

Mr. HARVEY. Yes?

Mr. OLSON. I'm Sig Olson, with the Forest Service. I'd have to echo what Bill just said, but on the Porcupine, I'd like to emphasize that not only the Porcupine, itself, with its rampart, is an interesting place to float, the side canyons, several small tributaries coming in, a very spectacular canyon, people that are willing to hike a little bit have the opportunity to see some very interesting and colorful scenery there. Also the Porcupine is an international waterway. It's accessible from the MacKenzie. Increasing numbers of people coming over and parties coming over each year on the raft, over to the bell and on down, and imagine with the Dempster Highway coming into being, the—more and more people will be using the Porcupine as a float trip.

Now, the Sheenjek and the Colleen are also good floats. The Black is more a river that you'd rather run with a riverboat, although the upper reaches are accessible by old airstrips that you can fly in and float down. One thing I'd like to point out about the area is that this area is recreation for the local people. There are seven, eight villages involved and although their recreation is tied in with their hunting, it is truly a place that the local people use for recreation. They jump in the riverboats, run up and down the rivers, and they enjoy it in their way. There is sport fishing on the various lakes and fresh water tributaries of the Porcupine and the Yukon. Of course, the large numbers of waterfowl, the fair amount of wildlife, do provide opportunities for photographing, scientific study opportunities and, of course, there's big game hunting that takes place in addition to the hunting that the people do, the local people do to fill their larders. I think that the road access, as it develops into the fringes of this area, is going to greatly enhance the recreation activities and also increase the recreation activities, particularly those that are water oriented in nature. That's about it.

Mr. HARVEY. Any other comments? Yes, Rich?

Mr. GORDON. OK. Just on the Porcupine, to put a statewide perspective, this is one of the three areas, the second of the three—we've talked about the Nowitna tributaries and Bony Creek—in which a gently rolling to flat upland is deeply incised by narrow river gorges. In this case, as Dick said, the primary gorge is on the main tributary—is on the main river, with several of the rivers having very spectacular subsidiary gorges in otherwise flat country.

I want to talk primarily about the White Mountains, which are in the coalition's proposal and which the coalition considers extremely important, because of its relative accessibility, the traversability of the country and the fact that it is a very scenic range, which has pretty much wilderness quality and yet has cabins, airstrips, the sort of things that some of the Yukon Charley country lacks. It is one of the two areas in the interior of Alaska, according to my findings in the study, which has the greatest diversity of significant landscape types, both in interrelationship to one another. As I will describe, they are somewhat different than those in the Ogilvie/Charley. First of all, the Yukon Flats, themselves, and the biologist most familiar with the area feels that a system of new trails could be developed on the Yukon Flats without significant disturbance to the waterfowl. Visually, you have a large brown silty, fairly fast river, with heavily wooded, heavily forested levies along the banks and many sloughs going back in and you have variations in color from rather green, algae-covered sloughs to muskegy wine-colored sloughs, a lot of clear water ponds, lakes and subsidiary streams. The second element which is apparently, from map studies, better expressed here than anyplace else, a marginal terrace to the Yukon Flats, which is separated from the Flats by a 150- to 600-foot sharp escarpment. On this terrace, which is to the south of the western part of the flats, is a rolling terrain with about—reliefs up to about 400 feet within it.

It is full of thaw lakes. On the map, it has very much the same appearance as the heavily morainal lake deposits, such as the Swanson River, Swan Lake country and the Kenai, but it's a different form. Probably the best example of this, or as good as any in the State. The third immediately adjacent areas are several 3,000- to 3,500-foot peaks, which are marked Wolf and Glacier on the topo map and which provide a direct precipitous vista onto this marginal terrace and the Yukon Flats. Probably you have a closer propinquity to the flats with these mountains than any other mountains around the rim of the flats, than most of the other solar basins in Alaska.

The fourth visual use is the area around Mount Swatka, Victoria Creek area, which I really can't say too much about, but this is a somewhat higher range of mountains. You can look down across Glacier and Wolf peaks and again have the vista of each of the three areas I've talked about beforehand. Victoria Creek is the northern boundary, in effect, of the White Mountain proper. The fifth unit, then, is the White Mountains, and the White Mountain proper is a reef, if you will, a rather narrow, somewhat linear mountain range that runs from east to northeast, to west/southwest. It is a layered type of bedrock, represented to some extent in the Ogilvies. Nowhere else represented this significantly in Alaska. It is a combination of limestone and greenstone in beds, it tends to turn white with weathering, and that's why it's called the White Mountains. It tends to erode into sharp faces, which are very, very—they're not smooth like in the Ogilvies. They tend to be very crinolated and rough-edged, with a lot of rock, narrow glens. It's probably the classic example of limestone or crushed type topography. There's a lot of erosion in this limestone from water and ice act—freeze/thaw activity. It compares in some degree with Wellesley Mountain National Park in Texas in this regard, except it is more a range of mountains.

It is then surrounded—well, immediately adjacent to it is Fossil Creek, which is a rather narrow valley, separated by another mountain ridge to the south and this valley has some very interesting limestone outcrops and erosion features.

Finally, the sixth feature is Beaver Creek, itself, which I presume BOR and others will describe as a recreational river. The river is a relatively easy, safe float stream. It's easily accessible by road or by a short jeep trail from the road. There's an easy takeout at the lower end, because it comes out on the Yukon Flats and it comes out of the Yukon River. The river winds west, then goes north, cutting through the White Mountains and there's a large limestone, sort of a dome-shaped formation right up to the river at that point, and it curves around back east around the northern front of the White Mountains south of Victoria Creek and then turns north. This combination of features, with the diversity of land forms, visual types and this classic example of limestone solution and frost dissolved topography is, as I say, one of the two outstanding landscapes in the interior of Alaska.

Mr. HARVEY. Thank you. Dave, what's your definition of road accessibility?

Mr. DAPKUS. I would have to disagree with that. I think it's 5 miles in and the road you're talking about, most four-wheel drives couldn't make it.

Mr. HARVEY. You're not disagreeing with each other?

Mr. GORDON. I think the BOR idea was that that would be improved, to improve the access.

Mr. DAPKUS. Not that I know of.

Mr. GORDON. Oh, really? In an early draft—well, in any event.

Mr. HARVEY. Any more comments on this? Yes?

Mr. REFFALT. Yes. I just wanted to make two additional points. One on the historic, Mr. Dapkus did mention some of the history. Fort Yukon wasn't part of the Hudson Bay Trading Post that operated within Alaska, even after the—for almost 1 year after the State was purchased by the United States. It is a very historic area associated with that trading post. In the archeological area, the Athabascan Indians that have occupied this general region of Alaska do have or at times have been associated with Old Crow in Canada, directly on up the Porcupine River, and with the fairly recent discovery of the oldest site of human habitation in the Arctic near Old Crow, one would probably draw the conclusion that the possibility of adjacence in Alaska would be very high for finding some very old human sites in that area.

Mr. HARVEY. Yes, Dave?

Mr. KLINE. Dave Kline, Alaska Coalition. In addition to the very important local and regional recreational values and I think more importantly, subsistence values, is what we have to recognize as national and international recreation values of very important exported resources from this particular area, that is, the Yukon Flats, and that's vast numbers, actually in the millions, of migrating waterfowl.

These waterfowl have esthetic values to millions of people throughout the United States, Canada, and other countries, they're used for recreation and for food in some of these places. Of course, they also have scientific and educational values. I feel that the spectacular fall and spring flights of ducks and geese, particularly passing overhead of people in other countries and in the lower 48, are still extremely important and probably becoming more importantly so as people become more urban in their residences. These national and international values, I feel, are also extremely well known, because this Yukon Flats has been thoroughly studied for years and years, going back to the 1960's, when the Rampart Dam was proposed, as we all know. And I believe it was the national and international values, primarily, in addition to interests of the local people that actually resulted in that dam being never authorized, despite widespread promotional efforts, intensive promotional efforts, both in Alaska and nationally. So I want to stress the importance of the exported recreational values of the resources in this area.

Mr. HARVEY. A good point. Any other comments on the landscape and scenery? Yes, Dave?

Mr. DAPKUS. I neglected to mention, and that is, we term the Porcupine a working river like the Yukon and the Kuskokwim, everybody still uses it. There is large traffic going up it today. The Natives use it. Everybody else uses it to go on into Canada, and I think this is very important.

Mr. HARVEY. Thank you. Yes?

Mr. EVANS. My name is Charles Evans. I'm speaking for the Alaska Coalition. I'm a little bit troubled by the way the flats have been treated in this discussion. You don't see much of the flats going down it in a riverboat, you don't see much of it from the air. You see it on foot, and as I think a couple of people pointed out, the diversity is on a small scale, but as a place to live, Alaska is made up of a lot of scenery standing on end, but the people live and have conducted their activities in more or less in alluvial or at least lowland areas, and the Yukon Flats is an outstanding one of these and if you have developed a sense of what Alaska is in terms of its earlier culture and present day culture, I think then you'd begin to develop a perception of the Yukon Flats that is—I don't know. I'm sure you can't call it scenery. I'm troubled by this word, scenery. But I can remember a number of very spectacular occasions on the flats. One of the lakes, I've spent a couple of nights on one of the lakes back in the flats and believe me, I never heard so many songbirds anywhere else in Alaska. And of course, other places, you run into fair numbers of cranes. You don't run into large concentrations of much of anything in the flats, except waterfowl, and there are some very spectacular concentrations of ducks, primarily, and geese in the fall. But as a place to live in, it is something different than scenery. It's a—as I say, a place to live and travel. These remarks may apply more to the people that live there than they do to, perhaps, the people we think of as tourists. But—and I'm sure that many of the people who live there don't perceive this until they leave it. That's all for now. I just wanted to make that remark for the record.

Mr. HARVEY. Thank you. Any other comments?

Mr. OLSON. Sig Olson, Forest Service. I agree with Chuck and I think what he's trying to say there is, it's sort of a sense of place, it's an experience that—it's an experience that you can only know by being—spending some time in a place like this. It's not a magnificent, soul-stirring affair, but it's a bit of rural Alaska that is every bit as Alaskan as climbing McKinley or doing something more spectacular. One thing I wanted to point out is the lower Sheenjek River, in this sense, it's not a spectacular river at all. It's a meandering, slow river and it's not a great exciting thing to run down in a canoe after you leave the hills, but it is a nice place to be and I—one of the reasons I believe that the Sheenjek makes a good scenic river is because it covers some highline country, rapids, on down to very quiet, usable rivers in the lower parts. It is used by many local people.

Mr. HARVEY. Thank you. Before we go on to pick up the wildlife values, I would like to make one other announcement. I stopped in at the office down the hall here on the way back from lunch to thank those ladies who work for the Native Claims Appeals Board, for making a lot of extra coffee in that pot down the hall and I told her, I hoped that everyone had been paying, and she said, well, I don't think they have, but we'll keep making the coffee anyway. I don't know if everyone understood that the pot that's been in this room, the Land Use Planning Commission has been providing that and that has been without charge, but the folks down the hall are just doing it out of the goodness of their hearts and for those of you who may not have known that or anything else, they still have their little cup out for coffee, so if they have some, I think we should be paying for it, certainly. How about the fish and wildlife values? Yes?

Mr. MOWER. Excuse me. Could I just add one other point to the scenic values? My name is Fran Mower, with the U.S. Fish and

Wildlife Service. On the Porcupine River, as you enter Alaska from Canada, there's one other interesting scenic thing that I'd like to mention here about that river and that location. It's a long, very old traditional caribou crossing on the river there and when you pass through the bluffs, right at the border there, there are some very deep rotted caribou trails and it's a real interesting soul-searching thing to see, to see these trails very deeply worn in the banks of the river there. Thank you.

Mr. Harvey. Thank you. Fish and Wildlife. Go ahead.

Wildlife and Fish Resources and Uses

Mr. Swenson. My name is Lou Swenson, with the Fish and Wildlife Service. Migratorial birds and fish, particularly waterfowl and salmon, are of national interest in view of conservation treaty agreements with other nations. This 10,800 square-mile basin is Alaska's largest interior valley and is dotted with over 40,000 lakes, 25,000 miles of streams and oxbows and numerous potholes. The Yukon Flats ranks among the most important migratory waterfowl and esterine nesting areas in North America, attracting approximately 3 percent of this Nation's ducks. The nesting density for ducks is greater here than any other large area in Alaska and among the highest in the continent, approximately 100 per square mile.

The annual fall flight, at 2.1 million ducks and over 16,000 geese, migrate down all flyways, Canada and Mexico. By far, the greatest importance of the Yukon Flats for waterfowl is for nesting and rearing young. In years of drought in the prairie provinces of Canada, birds displace from their traditional breeding grounds, continue north, seeking stable water levels. In such years, the Yukon Flats waterfowl contribution is even greater and is increasing as long-term wetland losses continue in the southern breeding areas. Thus, the Yukon Flats is a segment of the continental waterfowl breeding grounds, almost unequalled in extent and high productivity. The high productivity of the flats results from both climatic and physical features. Temperatures show the greatest range of any location in Alaska, with occasional extremes of 75 below 0 to 100 above 0. Summer temperatures are often above 83. Water temperatures in the lakes and ponds may reach 75 degrees, promoting a rapid growth of the aquatic vegetation. Precipitation is only about 6 inches annually, however, the water areas are partly maintained by the irregular flooding of the Yukon and its tributary streams, and the lowering of water levels during these periods of low rainfall actually appears to be essential in the maintaining of productivity and fertility of these wetland systems. Lesser scaup are the most important or the most abundant species produced in the flats, followed by pintail, widgeon, green-winged teal, scoter, shelver, and canvasbacks. Of particular significance is the fact that the 50,000 canvasbacks which nest in the area represent from 10 to 15 percent of the average continental population of that species.

Band recoveries show that waterfowl produced on the flats contribute to hunting in nearly all States, as well as Canada, Mexico, and much of the Caribbean area. As with some of the waterfowl, several other species of birds are transcontinental migrants, breeding on the flats and wintering along the eastern seaboard, the Gulf Coast States and into Central and South America. One hundred and thirty species of birds have been identified on the flats, and primarily the migratory birds, however, 13 species remain as year-round residents and among these are 4 species of grouse. Mammals on the Yukon Flats and its surrounding drainage areas include caribou, moose, grizzly and black bear, wolf, Dall sheep, and wolverine. All fur bearing animals common to the interior of Alaska are found on the flats. Historically, the area is one of the major fur producing regions of Alaska and was the site of the first Hudson Bay trading post in the State.

A short bit on the fishery resource here, the waters of the flats contain northern pike, whitefish, and 19 other species of fish. Migration routes and spawning areas for chinook and chum salmon contribute to an annual escapement of 270,000 fish from the unit, making it significant both in amount and in the length of migration associated with this anadromous fishery. I think I'll stop at this point.

Mr. HARVEY. OK. Does anyone have anything to add to that?

Mr. WILLIAMS. Would it be possible for you to delineate with one of the wax pencils, the critical waterfowl habitat areas on the big map up here?

Mr. SWENSON. Roughly.

Mr. REFFALT. Bill Reffalt with the Fish and Wildlife Service. We have a map here that we can get out, statewide, that shows the various waterfowl density and nesting grounds within the flats.

Mr. WILLIAMS. Would it—does this show also the proposal boundaries, so that we can get a relationship to that? I think that's what I'd like to see, and then with that, I'd like to turn this over to Paul Williams. He's from Arctic Village of Enakai and represents that corporation and those people who live up there.

Mr. HARVEY. All right. Go ahead.

Mr. WILLIAMS. All right. My name is Paul Williams. I'm an Indian from Arctic Village and I'm talking about wildlife habitat, talking about endangered species and I think the Native people should be possibly included in the category of endangered species and this is all very serious to me, and I'm glad to be here today to testify on behalf of the Native people that I represent. One of the Land Claims Act, we got land that has been aside as and identified as Indian Reservation and the land within these boundaries, we had 2 years to retain and not take part in any other settlements under the same Settlement act. My people, down through the history, have been very dependent upon the wildlife and the land was very important for them. They were dependent upon the caribou and the moose, the bear, sheep, the fish, all the wildlife and they have taken care of it, and under the same Settlement Act, we've been set aside only an amount of land that we can use in the future and we're receiving a lot of hunting pressure.

Before the Claims Settlement act, our people were nomadic. They moved behind the game, the caribou and the moose and they lived in particular geographic areas in a particular season. Ours is a big Indian nation. It extends up into the Crow Flats, like one gentleman mentioned, which is around the Crow Flats and all the Yukon Flats and down into Tanana and up into the Koyukuk area and over here up around the Fairbanks area. But each particular band of people are different in name, but basically Athabascan Indians. Down around Beaver is the Chekcheekuchin. Around Eagle, it's the Hungachin. That's where my father came from. In all different areas, got different—the language is basically the same, but, you know, a little bit different, different dialect. You know, there's been a change, because we had to move to one area, settle like in the Arctic Village where our kids can go to school. We can't move around like we did before and we have to learn how to live different ways, and we start moving from one culture to the other and we're kind of in a transitional period. I think one reason the people are having problems today are due to a lack of identity. They have no identity and they're, you know, caught between two points, and our people are going back to traditional values and this is good, but also we were forced into possibly developing our natural resources and maybe we have to do it, we're not sure. We try to keep the land the way it is, you know, and we proved that to you that we can do it and we did do it for the past several hundred or thousand years. But now because of the act of December 18, 1971, we're forced to develop—partially develop our land and develop the mineral resources and the renewable resources.

But we're having a lot of problems and more like ANCSA, the Federal Government is supposed to give us the land under a 5-year period, which it hasn't happened yet and we're being bombarded from all sides. Even the navigable waters has to be identified, you know, so the easements cut—the easement pressures have to be resolved and then we're way up there in the middle of nowhere and you have all these (d)(2) lands that have a big question. We're not sure how the people are going to live in the future, because after the (d)(2) issue has been settled, we don't know what to expect, you know, and our people are not educated. I'm lucky enough to have a high school education and understand it a little bit. But if the animals are not properly taken care of and properly managed and the land is not properly taken care of, we lose that, you know, you might have to include us on the endangered species list, because we're going to lose our people, we're going to split up and we're going to lose our language, our culture and I think this should be done. We've taken a good look at ourselves and the land that may possibly be given to us, the land that's been marked out over there on the map, the 1½ million acres that we've received that's right in the middle of the map. That really is—we didn't get no monetary settlement under the ANCSA and all we got was the land, and we got our go ahead to do a preliminary hard rock study last year, but we didn't come up with anything. But Roger made proper plans for the management of our human people and their animals. I just want to point out that these are some of our concerns. We're being pushed into an area that is not—we're not familiar with and at the same time, we're losing our culture. People are losing their self-identity, because we're receiving a lot of hunting and fishing pressure up in that area. The areas that primarily have been Indian hunting grounds, you know, we don't have those areas any more.

Other people come in and put too much pressure in that area, so that forces us to keep out of that particular area for fish and game. We don't believe in just going out after caribou, because I mean, the people have really got to need it before they go out and shoot it. It's fun to be out in a riverboat, like one man—one gentleman said a little while ago, but you know, the religion is tied to living with the land and the way we treat the water and the earth and the animals. People learn to be at peace with themselves. I don't want to take too much time here. Thank you.

Mr. HARVEY. Thank you very much. Any additional comments? Yes?

Mr. WRIGHT. My name is Don Wright. I'm the past president of the Alaska Federation of Natives. I was president when the Land Claims Act passed. We really, at the time that the act was going together, didn't realize how complicated it could become. It is quite complicated. I'd like to read to you a letter. I represent Arctic Village and Enakai. I represent the reservation as an Indian agent. We corresponded with Senator Jackson and with Siberling and with Judge Pratt and others and never received a formal answer back. This has been pretty near a year now. We've corresponded with the new President of the United States and have not received answers back. What Mr. Williams says is very true. It's a traditional group of people living in the middle of where all the rest, commercial ecologists, whatever you call them, are arguing what to do with the land. I'd like to read a cover letter of a document that I have submitted to the chairman. May I read this, sir?

Mr. HARVEY. Yes, go ahead.

Mr. WRIGHT. To Mr. Senator Jackson, Committee on Energy and Natural Resources.

> We request that the following statement be included in the record of the workshop to be held February 17, 1978, in Anchorage on the use of D-2 Lands in Northwestern Alaska. In 1957, we petitioned for additional lands for subsistence use to be added to our reservation. Accompanying historical documents support the necessity of our request. The petition was summarily set aside and never considered by the Bureau of Indian Affairs, nor was it considered by the Department of the Interior prior to the passage of the Alaska Native Land Claims Settlement Act. Historic subsistence use of lands and waters adjacent to the reservation are recited in a report on the cultural resources of the Doyon Region, Central Alaska, Volumes I and II, by Elizabeth F. Andrews, October 1977, pages 102 to 122, and 223 to 273. Herewith submitted for inclusion in the record. There are ninety-three well-defined settlement camps and significant grave sites identified within the report. A portion of the requested land, containing 14 traditional settlement camps fall within the Arctic Wildlife Refuge. The inclusion of that portion within our reservation is consistent with the designation of the Arctic Wildlife Refuge for traditional subsistence use. We have a prior claim to the land, the use of the land, the water and the natural resources. The Aboriginal inhabitants of these lands have managed the resources for thousands of years. The ecology of these lands is endangered because of the efficiency of transportation and the use of natural resources for sport rather than subsistence.
>
> The pressure to the ecology by an increasing population will continue. Decisions must be made about who will use the land, for what purposes, based on the recognition of Aboriginal subsistence use of the land, water and natural resources. Land set aside for public use under Section D-1 and D-2 of ANCSA must have substantive use, hunting, trapping, fishing, plant and berry gathering, as a first priority. If the Federal Fish and Wildlife determines that there are an abundance of these resources, enough animals, plants and berries to withstand the pressure of non-subsistence utilization, the resource could be opened to individuals for limited

sport hunting and fishing for personal use. Secondarily, the resource could be utilized on a permit basis in areas not being seasonally utilized for subsistence by persons, for camping, hiking, flora and fauna observation and photography. To ensure the survival of the Native inhabitants and their subsistence based culture, the Natives of Alaska must be given priority in their use of the lands, the waters and the natural resources. Jurisdiction over the lands and resources must be vested in the Federal Government. The Federal Government has the responsibility of assuring the survival of the Aboriginal inhabitants and their cultures. We need the land to live. Signed Gideon James, First Chief, Chief of the Native Village of Enakai Tribal Government.

This is a petition that was submitted by the residents of Arctic Village to the Interior Department under the U.S. Congress instructions, that the Native people had the right to petition for a reservation and that the Bureau of Indian Affairs, through their Commissioner, under the Secretary of the Interior and through the local representatives and local superintendents in the area, would receive and consider this and follow it through. Those agents of the Federal Government were ordered by the act of 1934, 1936 and 1938 to obey the request of the Native people who chose a reservation status, who chose to live in the traditional way and, legally, they are entitled to that by authority of Congress, yet on July 22, 1957, through a petition from Arctic Village that says:

The reasons for this request of additional lands are as follows: when the representatives of the Government formed the reservation, none of the people in this area knew of the meeting; we had no chance to tell what lands we used to feed us and support us; the reservation formed gives us the land that our Village sets on, but it does not include the lands to the west and the north that we use as our fishing and hunting camps or where we trap; the boundaries of these lands are as follows on the next page.

It's signed by every adult member of the village.

The people of Arctic Village wish to have new reservation boundaries to start in the following points and to be taken from the Arctic Quadrangle, U.S.G.S. in 6800W West 140–0080 by 180.

Starting on the west bank of the east fork of the Chandalar River, where the sixty-eight degrees, 00 minutes latitude crosses the river and following the latitude line due west to the intersection of 140 degrees west and sixty-eight degrees north. From this point of intersection, the boundary line then bears due north to approximately sixty-eight degrees, thirty-three minutes north, or where the crest of the Phillip Smith Mountains intersect 140 degrees west. The boundary line then swings east and slightly north, following the divide of the water shed, with the Young, Jick (phonetic) and tributaries on the east fork of the Chandalar and tributaries within the boundary. This boundary bearing east by slightly north along the crest cuts the ninety—the sixty-nine degree north parallel at approximately 144 degrees, 23 minutes west. From this point of intersection, the boundary then swings due east to the intersection of 144 degrees west and 69 degrees north. From this point, the boundary swings due east to where the Peter John Creek and the Sheenjek River split. At this fork, the west bank of the Sheenjek begins to serve as a boundary and does so as far downstream as the forks of the Shinjack River and Old Woman Creek. At this fork, the south bank of Old Woman Creek serves as a boundary. The boundary goes up Old Woman Creek, south bank, and follows the left creek, following into Old Woman Creek approximately five miles from the mouth of Old Woman Creek. The boundary follows this unnamed creek to its source and continues up to the top of Index Mountain.

The boundary follows the crest of Index Mountain, groups south by southwest to the point where Connis River and 68 degrees north latitude intersect. From this point, the boundary goes west to intersect with the present boundary of the reservation. From this point, the boundary goes due north along the present line of the reservation to Trick Creek. The boundry then follows the north shore of Trick Creek to its mouth and then joins the west bank of the Chandalar, to the starting point at 60 degrees north, 145 degrees, 58 minutes west. This area would include Smoke Mountain, Nest Rocks, Otter's Tail (phonetic), Misty Mountains, Little Nuju Mountains. Nikchinthral Mountains, Signal Mountains, Titus Mountain, Ambrose William Mountain and the south slope of the Phillip Smith Mountains. In these mountains, we people hunt caribou and sheep. In these mountains, we hunt bear and wolf. These mountains are the breeding grounds of the caribou we hunt to eat. This is the area—in this area are found many of our trapping and fishing camps. Here on the Chandalar and the Junjik and the Sheenjek, we have built our trapping cabins. In the many lakes and streams along these rivers, we hunt moose and ducks. We cut our firewood along the streams. Here is where we people net our fish, hunt rats, trap beaver. This is the land of our forefathers and this is the real land of the people of Arctic Village and not the land given to us to the south that means nothing to us.

The answer from the Commissioner of the Bureau of Indian Affairs, 19—January 20th, 1958.

Attention Realty: You will find enclosed a petition signed by the Native Indian people of Arctic Village, requesting an increase in the size of the Enakai Arctic Village Reservation. You will also find enclosed a map showing the additional area requested.

On May 20, 1943, a proclamation was issued by the Department, designating as an Indian Reservation for the use and occupancy of the native inhabitants of the Village of Enakai, Arctic Village, Christian Village and Robert's Fish Camp and vicinity, covering an area of approximately 1,408,000 acres. This reservation was accepted by a unanimous vote of the Native people at an election held on March 1, 1944, at Enakai, Arctic Village, Christian Village, Robert's Fish Camp and Suku. In the Native's petition, they have requested that a reservation including approximately $2 million—2 million acres additional of land located northerly from the existing reserve and covering their fishing and hunting camps and trapping areas. You will notice that they state in their petition that when the present reservation was formed, none of the people in the Arctic Village area knew of the meeting. The petition which requested the establishment of the existing reservation was signed by several of the Natives of Arctic Village, who also signed the enclosed petition. Since the reservation was accepted by unanimous vote of the Natives of Arctic Village on March 1, 1944, it appears that the Native people residing in the village at the time must have known the size of the present reservation when they voted to accept.

It is our understanding that a considerable number of the present Natives residing in the Arctic have moved there since the reservation was established. These Natives undoubtedly need and use the additional area requested as a reservation, but it is located many miles from any non-Native settlement, so it is doubtful whether they would have much interference in their use of the area for fishing, hunting and trapping. The authority of the establishment of an addition to the above mentioned existing reservation is contained in the Act of May 1, 1936 (49 Statute 1250), however, it is our understanding that it is not the present policy of the Department to establish additional reservations for Natives in Alaska. The enclosed petition is being submitted to you for appropriate action, pursuant to the existing policy of the Department. Please advise this office if you desire that an investigation be made at Arctic Village on their request for an addition to the reservation.

Then on May 22, to the Area Director in Juneau:

> This refers to the acting Area Director's letter of January 20, with its enclosures concerning the addition of approximately 2 million acres to the Enakai Arctic Village reservation. In view of the fact that the Natives are using the area requested for fishing, hunting and trapping without interference from non-Natives, there appears to be no urgent need to set aside the area as an addition to the present reserve. In any event, no additional reserves are proposed to be created in Alaska until after public hearings have been held. Under the above circumstances, the Department would not be disposed to call for public hearings at the present time. We are, therefore, filing the petition without further action. However, if there is a possibility within the foreseeable future that the influx of non-Natives in the area might seriously jeopardize the hunting, fishing and trapping opportunities of the Natives or if it is ascertained that the livelihood of the Natives is dependent upon the area, the matter will receive further consideration.

Now, I submit to you ladies and gentlemen at this hearing, this workshop, that we all have, under one law, the Constitution of the United States and the constitution of the United States guarantees the rights of the Native people. The Congress of the United States, in its wisdom, after they decided not to treaty with the Aboriginal people of America, when they chose not to treaty on the basis of sovereignty, they passed the Indian Organization Act and gave Indians an opportunity, Eskimos an opportunity, Aleuts an opportunity, to choose to either retain their traditional way of life or fit into the 20th century or whichever, in a different society, in a different means of a livelihood. These particular Indian people chose to establish a reservation, that is, a reservation that they chose for themselves, not to be infringed upon at the will and the whim of whomever wants to look at flowers or look at mountains or look at animals, whomever destroyed their own area, their own culture, but chose to retain that and preserve it for the future generations of Indians, an extinct—possibly extinct species of people. You talk about real, honest facts, you talk about esthetic values, you talk about humanity, this is a group of human beings that, under suppression, the pressures of Congress, chose this and tried to live by the law and to this day are still struggling as those who would be recommending from a committee such as this, will advise Congress to pass more laws and more infringements upon their human rights, their dignity, their lifestyle, their traditions. I submit to you that their request, that they be given the right in this (d)(2) area to exclusive hunting and fishing rights, commensurate upon the capacity of the land to sustain subsistence rights, be honored.

In addition, and I won't go through the rest of it, there was a study done after the Native Land Claims passed which is attached, which shows the location of the gravesites, the location of their culture, their caribou fences where they managed the resources, the caribou, where there are hundreds of miles of fences, where they put up log fences with stone axes, cut the trees with stone axes, proven hundreds of years old, where they caught caribou, where they changed the migration patterns of caribou to where there were better feeding grounds, where they in a true sense, talk about reindeer husbandry or cattle husbandry, where they actually changed the lifestyle to better the caribou herd, to turn them into better feeding areas. I don't know how good our Fish and Wildlife people are, State or Federal, when all they can do is fly around in $300-an-hour helicopters and study migration patterns and do nothing—do nothing to show the caribou the right way to go to get something to eat. Yet one caribou fence, alone, in the Arctic Wildlife Refuge is over 10 miles long and it must have taken thousands of man-hours to put it in there to turn those caribou, and we're talking about everything from the Yukon Flats to the Brooks Range and beyond. I sincerely request that you study this report very carefully, give it maximum consideration and realize that we're talking about endangered species of human beings who know, perhaps, more than many of us today. Thank you.

Mr. HARVEY. Thank you, Mr. Wright. I have one question. I'm not clear what your position is on this issue and one point with respect to the subsistence hunting and fishing, you said that Congress ought to give the Natives priority, subject to the possibility of nonresidents being able to hunt particularly, if there was enough game to sustain it. And subsequently you said that you wanted to have the residents have exclusive hunting and fishing rights.

Mr. WRIGHT. The Native people——

Mr. HARVEY. What is your position?

Mr. WRIGHT. Yes. The Native people have conveyed to me that they are not greedy. If a man from—a retired millionaire from the east coast wants to come and put up a cabin and eat a moose, we're not going to argue about that, but if a thousand of them come up and there are no moose left for the Indians, then——

Mr. HARVEY. Yes, I understand that.

Mr. WRIGHT [continuing]. Then it's wrong.

Mr. HARVEY. So you are saying the priority?

Mr. WRIGHT. Yes, and the other thing that I might say to the committee is that there was an agreement, through negotiation between the Indians in eastern Canada and Quebec and the Canadian Government, called the James Bay Agreement, and I would ask that you perhaps, as a committee, look at the James Bay Agreement which, in effect, gave the Indians exclusive rights of the fur bearers and they, in fact, owned them and they, in fact, harmed them through good preservation measures subject to the Federal Government taking a look and seeing that they are doing a good job of it, and then the Canadian Government subsidizes them to continue their subsistence life because, in fact, they are—they chose that and they cannot make a—and rather than go food stamps or go welfare, they subsidize them if they live traditionally and their subsidy, as I recall, is something like if they trap and hunt, fish and live 6 months out of the year, they get up to $6,000 subsidy, plus what they catch, provided it's consistent with conservation measures. And I think that that may have some substance in it that might be very worthwhile looking at from a conservation measure.

Mr. HARVEY. Thank you very much. Are there any more comments on the fish and wildlife resources?

Mr. BISHOP. OK. Dick Bishop, Department of Fish and Game. I'll make the comments short. Most of the major species have been commented upon or at least listed. Specifically with regard to the Yukon Flats and the moose population, there is an important resource, principally for local people. There is some use of it from—by people from other areas of the State. That kind of use is increasing in certain portions of the flats, namely, where there is access available and surface access and also through the use of airplanes. Moose populations in the Yukon Flats traditionally has not been very high, because it's not all that great for a moose range, however, it has its ups and downs at that, and at the present time, it's just as moderate to a perhaps slightly lower level. Other species that are perhaps of most importance in terms of local use there, principally of local use are fur bearers. There's—as someone commented, all of the principle fur bearers of interior Alaska are present in the Yukon Flats. Among those that are most important are muskrats, the harvest of which can be substantial in some years, lynx, when lynx are abundant, they're trapped extensively and the harvests are quite high in that area. Martin, in certain portions of the area, are very abundant. Some of the best martin habitat is up in the Black River country east of Fort Yukon and in the hills up in that direction, and it is at times a principal fur bearer for trappers.

On the south side of the flats, the White Mountains, which have been discussed extensively, do have sheep in them. The population is not very high. It is used very lightly by hunters, nevertheless, it does persist in there and it is an important—we consider it an important sheep population. Bears of both the black species and grizzly are present in the area and distribution is—as in most other places, black bear are the common bear of the flats and the grizzlies go to the uplands. The porcupine caribou herd, which Mr. Wright was talking about and will be discussing later, ranges onto the flats some, but not a lot. Principally in the area that has been considered for the Porcupine National Forest of the withdrawals in that area, up in the Black River part of the country and then on into Canada. Its use by the people on the flats has ordinarily not been very extensive, simply because they aren't usually that available. I guess I would reiterate that the principal uses of wildlife there are local uses and that's true of most of the other resources as well, and in general in past years, our regulations have reflected that as being fairly liberal and with lengthy seasons and so on. I think that I'd like to comment further on the porcupine caribou herd when the Arctic Wildlife Range comes up. Perhaps Mr. Regnart, of the Department, would like to talk about commercial fisheries.

Mr. REGNART. My name is Ron Regnart and I'm with the Alaska Department of Fish and Game. I'll first discuss the main Yukon River, generally from the area of Tanana upstream to Fort Yukon, and in this area, approximately 60,000 salmon are utilized each year. This is a recent year average, of which about half of these are commercially processed and the other half are subsistence processed. There are approximately, depending on the year, 80 to 100 fisherman that fish primarily gillnet and fishwheels in this stretch of the main Yukon. It is a very intensive—intensively used resource and the——

Mr. HARVEY. Is that commercial use or is that subsistence?

Mr. REGNART. Well, the 60,000 is combined. It works out that, for example, last year there was about 25,000 salmon caught for commercial and about 37,000 taken for subsistence. The commercial—the more commercially important areas would be Rampart and downstream, whereas the majority of the harvest made upstream is, say, Stevens Village, is primarily subsistence purposes. I think a ballpark estimate would be about approximately a half-million salmon annually that migrate through the main Yukon in this stretch of river, bound for spawning grounds not only in Alaska, but in Yukon Territory in Canada. If I may, I would like to discuss the Porcupine/Lower Sheenjek River system. Should this be taken up in a separate section?

Mr. HARVEY. No; that's all right. Go head.

Mr. REGNART. The Porcupine River receives a large run of fish that migrate through the Yukon River that I've just described. We estimate during some years, a peak abundance of 300,000 or more chum salmon will migrate to the Porcupine, bound for Canadian spawning areas. In Canada, there are up to 20,000 chum salmon taken some years for subsistence, primarily by the residents of Old Crow. Subsistence utilization in Porcupine River in Alaska is quite small, but we estimate that there are probably 2,000 to 3,000 salmon taken each year, but for subsistence purposes. There are no commercial salmon fisheries within the Porcupine River in Alaska.

Turning to the Sheenjek River in the lower 60 to 80 miles, this is a primarily important fall chum spawning area. This is one of the largest fall chum spawning grounds in the Yukon River Drainage. We have documented, through aerial count, up to 80,000 fall chums that spawn in this stream. The—This run of fish, although the utilization on the river is quite limited, limited to about two or three people, this stock of fish supplies subsistence and commercial catches downriver on the Yukon, all the way to the Bering Sea, a distance of over 1,000 miles. The figure falls off by indicating that there is a—some sport fishing activity in the area, primarily of the lower Porcupine for pike, grayling, and shefish, and also sparsely throughout the Porcupine River and as the—we've identified the lower Porcupine River, a very important potential site for furthering our studies of commercial subsistence fisheries in terms of the large spawning population that occurs there and we are investigating the potential placement of the counting tour or weir program to get a more accurate count of the salmon in that region. Thank you.

Mr. HARVEY. Thank you. I think I'll let the Fish and Wildlife Service talk about the critical habitat areas.

Mr. REFFALT. Yes; I might just—Bill Reffalt, Fish and Wildlife Service. I might preface my remarks very quickly here with what these maps are. About a year ago, we contracted with the Arctic Environmental Information Data Center to provide, on a statewide basis, an update on all wildlife habitats within the State for 33 species or species groups. We do have these maps for all 33 species or species groups in this size and also in the 1 to 1,000,000 scale, and they can be made available if the committee desires to have them in Washington at a later date. What we have here on the left of the audience is the fur bearer habitat and I think, Mr. Williams, that essentially this orange area outlines the key Yukon Flats Basin. All the proposals go slightly beyond that. These are the waterfowl, ducks in this case. We have some for geese and so forth, and again pretty much the basin described here. There are four levels, actually five levels described. The red area in the center being key habitat, the brown areas being high density habitat, the orange area, medium density, the yellow area, low density, and then a lower density around that, because there are waterfowl and other species of migratory birds around there that may not show up on the map.

Mr. HARVEY. Bill, may I ask you a question? Is there a significant portion of the key habitat area that falls within village selections?

Mr. REFFALT. Yes; in this particular case of the Yukon Flats, the five main villages along the Porcupine and Yukon River, main Yukon River, itself, all will have a major portion of the—what is described as key habitat.

Mr. HARVEY. But is it 50 percent or 80 percent or 20 percent?

Mr. WICKES. Mr. Chairman, just to give you some idea, we have some figures that might be pertinent. The State has identified 2.7 million acres as being in the top two levels for wildlife habitat and of that, 38 percent, we estimate, will be in final Native lands.

Mr. HARVEY. Thank you.

Mr. WILLIAMS. OK. Now, you had—Did you have a specific question beyond that?

Mr. HARVEY. No, no; I just thought that there were two things that it would be nice to be able to show in perspective, and one is the size of the proposal areas as to critical habitat and then secondly the fact that there are significant inholdings in the area.

Mr. WILLIAMS. This is true and I would——

Mr. BEVINETTO. I think we can, based on the map, concerning the inholdings thing we brought out again.

Mr. WILLIAMS. Yes, on this other map.

Mr. HARVEY. The other thing, we can see even here, though, that within the overall outer boundaries, that the darkest color which you can see at that area is obviously not the whole area.

Mr. BEVINETTO. Well, let me clarify something. Critical habitat is a—has specific meaning in reference to endangered species, and it also has some rather specific land actions which follow and if we're talking about critical habitat, that's one thing. Key habitat or habitat values are another, and I think we'd better get into that.

Mr. REFFALT. I would just mention, we used the word, key, because of that and——

Mr. HARVEY. That's my error.

Mr. REFFALT [continuing]. Associated with these maps and very critically important to them are—is a report which describes the various levels that are associated with these bands and how the various species were developed on each of the individual maps, and so that would be an important aspect to have.

Mr. HARVEY. Yes, Mr. Olson?

Mr. OLSON. Yes, we have a rough calculation of about 52 percent private ownership, but that can change.

Mr. REFFALT. The 2.7 million acres is approximately our estimate and you can vary it in location here and sometimes change the figures in terms of what would be key habitat and what would be some other.

Mr. HARVEY. Any other comments on the wildlife? Yes, Dave?

Mr. KLINE. Dave Kline, Alaska Coalition. Just a few brief summary comments in terms of what we view as important habitat considerations, both in the local, regional, and national context here. We want to stress that there are a number of factors that make this particular region of Alaska so outstanding, particularly in terms of its bird resources. One major element is the stability and we have to look at the stability with a brief historical perspective, and that is what scientists call Beringia, the Yukon River, its tributaries and extending out the Seward Peninsula into Siberia. This belt, if you will, of interior Alaska was icefree through four major glaciations and offered a stable and secure place for migrating birds all through those very stressful periods, during which time, or intervening periods, people and wildlife, of course, migrated to North America from Asia.

But this particular region did, in fact, and still does provide an escape valve for North American waterfowl and shore birds and other water related species. This was particularly well demonstrated, I think, this past year when the duck population index was the highest ever recorded in Alaska. This was 61—represented a 61 percent increase over 1976 and a 46 percent increase over the 10-year average, relating to the draught period on the northern States' prairie waterfowl breeding areas and the Canadian prairie provinces, when the birds moved north to escape the draught and spend the summer in the Yukon Flats and other interior wetlands complexes. This appears to happen at least once each decade, in a pattern that may go back through the ice ages. Again, the stability of these Alaskan habitats is exploited by bird masses which could not exist in such high numbers on this continent without this escape. I feel that such habitats will become increasingly important in the future. The southern breeding habitats on this continent continue to be lost at an alarming rate and if we examine the figures, and I'll only highlight a couple of statistics. The lower 40 percent broadly, in the more southerly breeding grounds, and up to 70 to 90 percent in some of them, have already been lost to drainage, primarily for grain farming. The U.S. Fish and Wildlife Service in its annual report indicates that the loss or deterioration of key waterfowl habitats has exceeded 300,000 acres annually in recent years and is continuing, so we want to stress what we see as existing and future importances of this particular area to the continent's—some of the continent's major waterfowl breeding population, considering the trend in the loss of habitat in the more southerly breeding grounds.

Mr. HARVEY. One more comment on the wildlife.

Mr. OLSON. Sig Olson, Forest Service. I wanted to stress the importance of the raptor habitat on the—in the Rampart Canyon, particularly peregrine falcon. It's one of the better areas for peregrine, supporting a fairly good population. The side tributaries, the Colleen, the Sheenjek, Black, the Christian, all have good raptor habitat, primarily for other species than peregrines, however. Golden eagle, for one, is an important one. But the side tributaries don't seem to support the peregrine falcon habitat populations that the main river does.

Mr. HARVEY. Go ahead.

Mr. EVANS. If I could make a short summary or clarification, we heard testimony, a good deal of testimony about the importance of the wildlife to local people. Mr. Bishop has summed it up from his viewpoint, and then we also have the importance—the national importance of a segment of that wildlife population of essentially migratory birds, and I think that this maybe should be spoken about and made part of the record, that these are two excellent, two separte wildlife groups, as as far as I, personally, can see, there's no incompatibility with the particular uses of those categories of wildlife. Migratory birds, for national use, and albeit, to some extent, their local use also, and perhaps even as time and competition goes on, primarily for local uses and consumptive uses, at any rate. At any rate, these are two fairly separable resources.

Mr. HARVEY. Thank you. Let's move on to the renewable resources area, timber, agricultural. Does anyone have any comments?

Renewable Resources

Mr. WICKES. Jim Wickes, Department of Natural Resources. In terms of agricultural, again referring to the Andrus proposal, those external boundaries, we find some 3.3 million acres of potential agricultural land within the Yukon Flats proposal. That represents some 17 percent of arable land within Alaska. There are 2.4 million acres of that land that rank in the top half on a statewide basis and this, in turn, represents 27 percent of the best agricultural lands on a statewide basis. I might add, referring this back to land status just briefly, if the State lands identified by our selection interest areas were to be given to the State, that together with the Native selections that will ultimately go the Natives, we think, one third of the best agricultural lands in the Flats areas would be in State and Native ownership. In terms of forestry, our inventory indicates that there are some 9 million acres out of the 11 million acre proposal area that have some potential, but in what we consider the best, that is, the top three levels, there are 2.2 million acres.

Mr. SILVER. Could I ask a question?

Mr. HARVEY. Yes, sir.

Mr. SILVER. Dave, how do the agricultural and timber lands overlap, if at all? Do they overlap?

Mr. WICKES. Yes, I believe they do.

Mr. HARVEY. Yes?

Mr. GALEA. John Galea, Forest Service. I'll briefly summarize the forest resource values, Mr. Chairman, but a larger summary will be included in our notes to the record. Speaking to the Porcupine National Forest proposal, there have been identified roughly 360,000 acres of commercial forest land that have the capacity of an annual potential yield of roughly 20 million board feet. The Yukon Flats Wildlife Refuge, which is in the refuge proposal, itself, is roughly 1½ million acres of forest, with commercial potential with an annual potential yield of roughly 12 million board feet. In the entire Porcupine/Yukon area that's identified in our area guides, of which you have a copy, there has been identified roughly 2.9 million acres of forest with commercial potential and an annual potential yield of 275 million board feet. At the best that we can determine at this point, Native and State selections within the area as a whole will include about 50 percent of the forest lands with commercial potential. Now, this particular area we're talking about is especially susceptible to wild fires. There's been an average of roughly 100,000 acres burned annually over the past 35 years. I say this, because yesterday we mentioned the values of wild fires as they pertain to the maintenance of certain wildlife habitat. It should be noted then again that the control of wild fires will be given much more consideration in light of Native and State lands selected, which should result in less wild fire burned acreages annually. Now, should this occur, and recognizing again that wild fire has played a role as far as maintenance of certain key wildlife habitat, the forest harvest and management could be essential from the standpoint of duplicating the role of wild fires, but at the same time provide some economic benefits for the local inhabitants.

Mr. HARVEY. I'd like to just note for the record that proposals that have been made from time to time for Porcupine National Forest do cut across the area we've been talking about as Yukon Flats, and as we indicated earlier in some of the other discussions, overlap into the additions to the wildlife range.

Mr. GALEA. That's right.

Mr. WILLIAMS. Is that where we jump from talking in terms of 20 million board feet a year for the Porcupine and 12 million board feet for the Yukon, and suddenly we talk about some entire area being 275 million board feet. How much more acreage are you picking up?

Mr. GALEA. The—I can't tell you the exact acreage, but it would include generally the entire Yukon/Porcupine area that was identified in the area guide, in the area planning that we have developed, and this is how we were able to develop our figures. Roughly, for the Rampart to the Canadian border.

Mr. HARVEY. Yes?

Mr. KLINE. Dave Kline, Alaska Coalition. In looking at the natural processes which maintain the high value wildlife habitats we spoke of earlier, I'm mentioning the stability in terms of water. We also have to stress the fact that the periodic flooding of the Yukon and its tributaries and then the drying of the wetlands and the presence of wild fire together recharge the nutrient base in the flats and contribute a great extent to productivity of this wetlands and adjacent nesting habitat or herd species we've been speaking of.

Mr. HARVEY. Yes.

Mr. WILLIAMS. I don't know if it's clear to everybody, but John's 255-million-board-foot figure was in regard to Native timber, too.

Mr. GALEA. Yes, that would include——

Mr. HARVEY. That would include resources of the area, would it not?

Mr. GALEA. I was speaking of the forest resources of the area. Thank you.

Mr. HARVEY. Go ahead.

Mr. LAVENE. Dave Lavene, Alaska Coalition. I think it's important that we get a few comments on the record about the potentials of commercial forestry in that area. I think we'd all agree that there are trees growing there, and I think that's where the concensus would end, would be the capability or advisability of large commercial forestry in the area, in terms of the impact it would have on wildlife as well as to the economic viability of that type of operation.

I think it's important to differentiate between a wood product industry that would be geared mostly toward local consumption and production of timber, versus something that would be geared toward exports from the region and perhaps pulp manufacturing. The economics of the really large-scale forestry in that area for export from the region, I think, are really dubious and we'll submit information for the record with that regard, and there's no need to really go over the figures here. So suffice it to say that the just prohibitive costs both in the harvesting in the area and shipping the product out of there, and we would see major conflicts with wildlife, in addition to wild fire management practices that might take place. Dave addressed that. Extensive road construction in the area for logging, as well as water quality problems from logging operations and particularly any kind of pulp mill operations, have very severe water quality problems, particularly in the winter when the flow of the rivers would be reduced, and also a high conflict with river oriented recreation, since a great deal of logging would be taking place near areas that people would be using for fishing and floating and that type of thing, as well as conflicts perhaps with subsistence uses that were river and forest oriented.

Mr. GALEA. I would just like to point out that similar forest stands are being managed presently in the Scandinavian countries and other northern latitudes, and in the Scandinavian forestry's report that has been submitted as part of the record, it was pointed out that 70 or 80 years ago, moose was an endangered species in the countries of Norway. Recently the moose harvest has been exceeding 60,000 animals per year, which I believe is three times the harvest here in the State. They attributed this to primarily the forest management practices that have taken place. I would also like to make a comment as far as the statement I made earlier, that forest harvest, forest management practices as they are known today can duplicate the wild fire effects that was mentioned across the table there, that were so important as far as recharging the water ponds and waterfowl habitat areas. This can be duplicated.

Mr. HARVEY. Yes. Yes, sir?

Mr. REFFALT. I would like to ask, Don, do you know what the scientific name of that moose is in Scandinavia, because the Scandinavian moose is actually the same as our elk, if you're referring to the moose there.

Mr. LAVENE. Yes, this is right, and I think the point I wanted to put out, we're speaking about big game animals, that we're in the problem areas, but we're able to be—if there wasn't any real conflict between forest harvests and the continuation of the big game herds.

Mr. REFFALT. OK. But the elk is a quite a bit different type of organism than the moose and I just wanted to understand whether you were talking about one or the other.

Mr. LAVENE. I think it would apply to both species.

Mr. HARVEY. Yes, Jules?

Mr. TILESTON. Mr. Chairman, I have—on Monday, I brought up the comment on wild fire and I can either address it statewide at this point or wait until access. It fits under either section, at your pleasure.

Mr. HARVEY. Go ahead.

Mr. TILESTON. All right. First of all, let's make four basic assumptions, which is critical, and I'm talking about the State as a whole. All of the State is scenic, all of the State has wilderness, all of the State has wildlife values and the State is different, and I think the differences being element—or is quite illustrated by some of the various proposals that you're seeing in terms of mining in parks, hunting in parks, and this sort of thing, all in recognition of this distinctive difference that does require specific legislative addressing. In terms of that, fire, as we were just discussing, affects all of these aspects. I have, for the record, a report from the last year's fire season, but I would like to highlight a couple of the statistics that are here. First of all, this—on page 43 and 44 are tables for the fire season, total cumulative, 1968 to 1977. In that period, there were 5,221 fires statewide, of which 2,709 or roughly 50 percent were man caused. Most of those man caused were concentrated in three areas, Anchorage, Fairbanks, and the highway net, which is what you would reasonably expect. Of the total acreage burn in that 10-year period, there were 10,604,110 acres. Now, this is cumulative burn for the 10-year period. This is statewide, it concentrates primarily in the Tyeega Forest, but it does go all the way from the Arctic Ocean and we had one up there this last year to the southern coast. So it is something that is important and how it is treated is going to be a major issue that Congress, itself, is going to have to address.

In terms of this last year, which was the third worst fire season in the history of Alaska, there were 2,296,000 acres burned. We had Native crews employed from 46 villages, we had 9,372 individual hires, which in turn made wages to those villagers, and here again I'm talking basically rural Alaska trained fire crews, $6,612,800, which is a significant cash contribution to the economy and is equally as important as the fishing and hunting and trapping which has been mentioned there, so it is a major element of the rural economy. In terms of this last year, it was our worst or third worst in 23 years, and I think in terms of some of the issues that we're dealing with, granted last year was unusual, but it does occur on a very regular basis. Generally, about every 10 years, and what we're dealing with, as an example, on the 11th and 12th of June, we had 12 fires started. One of those fires was to 1,200 acres in the same day that it started. So again we're dealing with extremely large areas. On July 8 and 9, 26 lightning fires occurred in the galena area alone. This is in an area where there are no roads. During the total month of July, there were 306 lightning fires and these ranged from Shismaref on the Seward Peninsula, to the Canadian border, from McGrath, northwest to a tundra field 300 miles north of Kotzebue on the Arctic Slope, and this is the second time in the recorded history that a fire has ever been found that far north. Very unusual conditions, but again these were all natural and we're talking about, in the long run, putting more and more people out here for recreation. These fires occur primarily in the hottest, driest time of the year. This is exactly when the recreation starts and this creates a long-term, very substantial problem.

On July 31 and during the 10-day period after that, 22 fires were ignited, which eventually exceeded 1,000 acres each. Twenty-six new fires started, 10 were extinguished, 62 were still burning as a result of earlier fires. A smoke fall covered much of the State. In terms of what can happen in an individual area, I would like to just address the Bear Creek as the specific case in point, which is right over the mountains from Anchorage. Here, near Farewell, a single lightning strike started, on August 6, a fire—when it was first noted—5 acres in extent. In 3 days time, that fire was 12,000 acres and it ended with a final acreage of 361,600 and snow put it out, man did not. Of the total effort on that fire, 75 percent of the total man-hours, fuel aircraft and everything else was concentrated in two areas. To protect a single lodge and to protect the village of Nikolai and Farewell Landing and to also try to maintain the fire on the south side of the Kuskokwim River as a natural barrier. That is where the total effort—the rest of the fire burned essentially uncontrolled, in a natural condition.

We've heard quite a bit of discussion about what fires can or cannot do, but one of the things that they can do and did do is, they shut down all air transportation out of Fairbanks in periods of years. This year, they did shut it down at the cost of—Dall Creek was shut down. Farewell was completely usurped as a fire fighting activity area and there was no private or commercial aircraft into that area during the time of the fire, so this was a significant impact in terms of transportation. The policy, and this is the Departmental policy, is as follows, and I'll just highlight it: Initial attack on all fires and to the available capability of logistics. The limit on man fire—man caused fire is a normal reason in State—let's try that again. The normal limit on on-fire manpower in a given year is about 2,000 and at the point we go over that, we do not have the logistics to handle it, and if you were here during the time of the fire on the Seward Peninsula, you came within 1 day of not going, for the simple reason that all of the aircraft were being restricted to put on that, so this is where we come into our 2,000 limit. We give first priority and adequate suppression capability to accomplish minimum loss on all fires which threaten life, property or has fire impact on resource bases. We use an action modification or fire impact classifications at the point we have multiple fires burning, and this is based on resource values, and I have two overlays, as well as a report, which I'll turn in.

One is a location of fires for 1970–74, so you can get an idea of the frequency distribution, and an overlay which indicates where we take first priority action when you're caught with a situation of not being able to fight all the fires. These essentially are the 212 villages and the road map and the pipeline corridor. Now, if we had moved the Bear Creek situation into the Yukon Flats, which is the area we're specifically discussing this afternoon, we've got an oil pipeline and the environmental concerns on constructing that, which were very sound and good, at treecover, coming up within 10 feet of the pipeline where it's above ground. We're going to be constructing an oil pipeline or a gas pipeline in the same area and that will have—both will have above-ground facilities, in other words, pump stations and this sort of thing. A major fire, and I say a major fire, not the routine situation, but a major fire will require the use of mechanized equipment. This is mechanized equipment and I'm talking about D–9 dozers. I'm talking about D–9 dozers in the summertime, and it will require mechanized equipment in order to begin to prepare the firebreaks to backfire. In all probability, this is in wilderness areas. So the mechanism for having the leeway for an instantaneous cooperative decision must be built into any wilderness legislation that relates to fire control. This is the big difference that I'm talking about.

Mr. HARVEY. Would I be correct that no such mechanism is in the administration's proposal?

Mr. TILESTON. I don't know. I don't believe it's there at this point. I know that it is being worked on, but I'm not sure that it's there at this point.

Mr. HARVEY. Probably Jules—I mean that's a very good point. I think we know the answer to that. The committee is currently considering the BLM's 4-year authorization bill. Nowhere in that legislation or any of the background materials submitted to the committee, is the issue—I don't believe, is the issue of any change in fire policy addressed.

Mr. TILESTON. All right. What you're—You wouldn't find in the BLM appropriation, I don't think, at this point, because we're assuming that 90-some million acres are largely going to be under the jurisdiction of the Fish and Wildlife or the Parks Service or the Forest Service and as a result, we would expect those agencies to prepare the fire contingency plan. Now, the one thing that has been discussed at varying levels, and I do not believe that a policy has been developed, is that in Alaska, we do have a centralized office of aircraft service. At this point, since most of the land is under BLM jurisdiction, BLM is the firefighting agency, but some consideration needs to be given, and I'm not talking about BLM, some to centralizing a consolidated Federal fire control effort to complement a consolidated fire control effort. The Secretary, under all conditions, is still responsible for fire control and 44 million acres of Native land. Most of those Native lands are located in high fire-prone areas, not all of them, but a vast majority of them. Particularly in these areas that we're talking about here. In terms of how you handle this use of mechanized equipment, now, I'm not completely familiar with how the forest service handles it in the lower 48, but I'm under the general impression and I have to qualify it that way, that when you're dealing with a classified wilderness area, for which a fire plan has been prepared, and again I stress fire plan, because this type of policy applies until you have an approved plan which describes where you can burn it and that you can control, that in classified wilderness areas, they do not use helicopter aircraft, they do not use even power saws. In other words, their plan is normally addressed to nonmechanized fighting the fire, and that works pretty well when you look at where most of the wilderness areas are and where they have their plans prepared.

In the vast areas, 10 million acres in the Yukon Flats, that just won't work and it does—again, this gets into this thing that there is a difference in Alaska and it's something that's going to require some special legislation or special attention or we're going to have a real donnybrook of where do you draw the fire line, and when I talked to my conservation friends in the lower 48 who are not always familiar with some of the conditions, the initial reaction is like you would do in the Grand Canyon or Rocky Mountains, is you'd create your fire line at the boundary. What you have to do here because of the remoteness, is you have to build a natural barrier and it may be the river. All right. Now, the rivers are exactly where we have heard previously, time and time again, timber values are going to be selected. That means that the barrier of the river is removed and we're going to have to come back in, and that means that in many cases we will have to have the leeway to do whatever is necessary and prudent, and I'm talking again not an arbitrary decision, but a resource decision, which protects not only the Federal lands, but the adjacent private lands and their resources, and we don't have that capability at this point and I'm very seriously concerned.

Mr. HARVEY. Thank you.

Mr. REFFALT. I'd just like to point out that there is no proposal before the Congress that would make the Yukon Flats total wilderness. The administration's position on the Yukon Flats had been that it needed to be studied and these were some of the factors that we felt made that desirable, and the current wilderness proposal in H.R. 39 includes two much smaller areas than what Jules was talking about. I think we recognize, in the Fish and Wildlife Service, the need to have these plans done well ahead of time and to have the lead agency and that sort of thing, but I'm not sure that the magnitude of the conflict is quite as great as Jules portrayed it, because the wilderness is what he was mostly pointing out and I don't think that it's that extensive today.

Mr. TILESTON. I believe there is a serious resource conflict in addition, because fire, in terms of timber and in terms of moose habitat, as opposed to caribou habitat, both of which use this area, have entirely different impacts and what you decide to manage the area for, and I say manage, dictates other things that you take into account in the fire management or whatever has to fit into that. I do have for the committee an analysis, and this was handed to the agencies here in Alaska. We have been working with the Federal agencies that were involved in the fire—the development of fire plans and who are consulted as we go, for the past several years. There is one which lists the frequency of fires in the Andrus position. It just gives you numbers. There's another one for the Morton Proposal, so it gives you both.

Mr. QUARLES. The Congress has before addressed special fire needs in certain wildernesses. In the national forest wilderness in South California, the Congress not only agreed to have mechanized equipment to overcome the fire, but to maintain fire roads, because it is near a highly urbanized area, so they did have specialized needs, but they have recognized those.

Mr. LAVENE. Thank you. I'm aware of the differences. I'm just saying that we need that sort of thing also.

Mr. HARVEY. Are there any comments on renewable resources? Yes?

Mr. LAVENE. Dave Lavene, Alaska Coalition. If I could just briefly get back to cutting trees instead of burning trees for a second. The comparison was made between commercial forestry in Scandinavia and Alaska. I think it's important that the committee recognize that there are very significant differences in terms of climate, access, and the way the forest industry developed in Scandinavia, versus the way it might develop in the interior of Alaska and we can submit some additional information on that. Another point, we've been using the term, commercial forest, and I think it's important to point out, that's a biological definition, not an economic one, that refers to land that can grow 20 cubic feet per acre per year. It has no economic connotation whatsoever. Again, I'd like to point out, I think there's a very significant difference between talking about developing a forest industry that would be important to the region, that would be a much smaller scale than one that would involve all the land, both Federal and private in the area, and it would involve substantial export of timber outside there. I think it would be environmentally very bad and I don't think it's at all economically feasible to develop the type of forestry industry for major export from the region.

Mr. HARVEY. Yes, Mr. Evans?

Mr. EVANS. My name is Charles Evans. I'm speaking for the Coalition. I hope this is appropriate as a topic. In a way, it's getting mixed up with ecology, but it's a dirty word, I know. But we do have a very—fire does play a strong role in a system such as the Yukon Flats. I think we're all aware of that. The influence of fire on the nitrogen cycle, which is invariably overwhelming—overwhelming the upleasant factors—is very poorly understood. I don't think the foresters, themselves, know what the role of fire is on—as to the nitrogen cycle. Our own observations in the Yukon Flats have been that where you have water areas—now, we're citing the water areas and not the forests and not the uplands, but where you have water areas that were in the locale that have been recently burned, I mean, perhaps it's been a decade or so, there you have the high productivity of water. The implication to us was that this was a hot burn and because of the hot burn, you had a release of nutrients into soil, which again reached into the water areas. Apparently somebody of opinion in the forest—among forest lands considered that this is the way it works. Others are not quite so sure, but this is the way people do, essentially, go about their agricultural pursuits in cold Arctic soils. They remove the material that ties up the nitrogen and then they can—when they add nitrogen, it doesn't get bound up and something. Anyone here can correct me if I'm wrong, but this all has implications when you're studying a fire control program or a forestry program for a piece of land that has—is being depended on by people for production of resources that they have depended on for thousands of years. It's also highly productive and has had a long history of productivity of resources of national significance, and any time we go to tinkering with that to try to develop other resources, we should know what we're doing. That's all I wanted to say.

Mr. HARVEY. Yes?

Mr. KLINE. Dave Kline. Just before leaving this topic, I'd like to ask two very brief questions of the Forest Service for clarification, as to whether or not in their analysis of the region, they've determined that there is any large-scale timber development potential, that is, in the foreseeable future, and second, what the regrowth cycle is for the major tree species that would be harvested on the Yukon Flats, what the regrowth cycle is for these timber stocks?

Mr. GALEA. You'll find that in going through and looking at similar stands, what the Forest Research has been able to tell us up to this point, that the rotation age, as far as the time, for an example, that the conifers or particularly a white spruce would mature would very anywhere from 90 years to 150 years. This is the same rotation age that's being used in managed lands in the Lake States region, for an example. In the case of the hardwoods, your aspen and birch and poplar, the tree stands start breaking down at roughly anywhere between age 50 and age 70, so in order to utilize whatever fiber that might be utilized at that point, the rotation age would be reduced roughly to that particular point. What was your other question?

Mr. KLINE. The first question is, have you determined—what is the outlook for large-scale timber development on the Yukon Flats in the foreseeable future, based on your analyses?

Mr. GALEA. There has been some interest as far as the interior forest resources, 1967 or 1968, I believe. I think there is note made of this in the record. There has been Japanese interest, for an example, in the timber volumes in the Lower Kuskokwim, which a joint survey was conducted by the forest and BLM at that time to determine the annual potential yield. Market didn't develop at that particular time, to cause them to negotiate. The Alaska Native Claims Settlement Act came into effect and this sort of delayed that. Jerry Brady, who is the forestry consultant here, does have and did present a paper at the symposium held at the University of Alaska here this last September, where he identified interests as far as export material to Japan, and part of the statement, as I recall, mentioned the fact that the Japanese presently are interested in obtaining roughly 250 million board feet of green lumber, not round logs. They're willing to negotiate this. As far as the productivity of the commercial forest lands that we're talking about in reference to this twenty cubic feet per acre that was made this compares with—as I mentioned a day or so before, and even exceeds some of the industrial forest lands in Russia. I could name you four, five southwestern States plus provinces of Canada that really don't have this existing volume on hand that's been identified in the interior. The reason why it's not moving in the interior is because it is a relatively undeveloped area, much like our western States may have been 50 or 60 years ago.

One thing that should be pointed out, that the United Nations, in a number of reports and the President's Advisory Council on timber needs of the Nation through year 2020, the demand for volume is going to increase in double. When you look at the international picture to try and determine where this wood fiber is coming from you're pretty well limited. Any of the countries which we might—which were once exporters of lumber and pulp products are now prime importers and these can be documented or provided to the committee, if necessary. I'm sure you have this information. So the point is that we're talking about potential at this particular point.

Mr. HARVEY. Fine, thank you. One more comment.

Mr. TILESTON. Just a short clarifying point. I may have left a misunderstanding or a misimpression. I said that of the total number of fires, approximately 50 percent are man caused, and that is correct. Of the 10,500,000 acres burned, however, man-caused fires only accounted for 1,500,000. Again, this goes directly with the fact that most man-caused fires are on road nets where they can easily be caused and can be controlled. And this is wildfire, not structural fires.

Mr. HARVEY. All right. Let's move along to the non-Federal lands situation, State and Native.

Mr. EPPS. May I speak to agriculture before we move on?

Mr. HARVEY. Go ahead.

Mr. EPPS. One of the things I would like to do is place the agricultural values of the Yukon Flats in perspective as it relates to the whole State. First of all, agriculture is one of the fortunate resource agencies sitting around this table today, in that we have already completed a statewide soil survey and we have the preliminary soil survey data. We can say, with a fair degree of confidence, that there are roughly 18.4 million acres of the entire State of Alaska which do have agricultural crop capability. That's about 4 percent of the entire State of Alaska. As was pointed out earlier through the State, the amount of land on the Yukon Flats is considerable. The cumulative impact of the various (d)(2) proposals, primarily Secretary Andrus' proposal, reaches somewhere between 35 and 38 percent of the State's agricultural potential. The 17 percent of that occurs on the Yukon Flats, out of the total State's—or wait a minute, excuse me. Seventeen percent of the agricultural soils that are impacted are on the Yukon Flats, or 53 percent of the total, out of those that were impacted by (d)(2) legislation. The importance is even further emphasized for the fact that the Yukon Flats is one of the few areas we've talked about to date that has transportation into both ends of it and has a major international transportation corridor running directly through it. The rest of them are isolated and are very difficult to gain transportation to. One of the things that I would like to do at this point is to allow Bert Clifford to describe the soil resources in a little more detail, and then I would like to come back and just briefly run through some of the resource values that can be accommodated with this resource.

Mr. HARVEY. Go ahead.

Mr. CLIFFORD. Thank you, Mr. Chairman. I'm Bert Clifford with the Soil Conservation Service, an agency within the Department of Agriculture. I have been working in the last—since 1966 and am presently a resource conservationist here in Anchorage. I've spent 9½ years in the Fairbanks office as a district conservationist. As Professor Epps has mentioned, we have completed an exploratory survey of Alaska and have been able to note with a fair degree of success, the various types of soils that we have, and from this have actually been able to basically certify the amount of agricultural potential there is within the State. I would like to emphasize that when we're speaking about agricultural potential soils, as referred to from the exploratory survey, we're speaking about large landmasses. These are not scattered small parcels, but they're large landmasses of possibly 10,000, 20,000 acres or larger, so they're quite uniform and quite singular as far as their type is concerned. They're basically flat, well drained, and quite deep soil. Most of these soils are of a low erosion hazard in an agricultural use.

The Yukon Flats has two major kinds of soil associations. Broad flood plains along the Tanana River and its major tributaries, and terraces and low hills bordering the flood plains. On the flood plains, approximately one-half of the soils are deep, well-drained, stratified silts and sands. Permafrost is deep or absent. Although many of these soils may be subject to flooding in the spring before seedingtime, they make up most of the most productive topland in the State Essentially similar soils have successfully been used for crops in the Tanana Valley for many years, and I would impart this point to suggest to you that most of the foods, such as the fresh produce, the milk, meat, feeds for livestock, such as the horses that were used in the mining days, were produced on these kind of soils in the Tanana Valley. These and many—let's see. The remaining soils in the bottoms are fully drained and have shallow permafrost. These and the many sloughs and lakes in the area are used for nesting sites by a large variety of migratory birds. There is a concern of a conflict between agricultural and waterfowl uses, but since each concentrates on its own soil or type or situation, this would be minimized by good planning.

On the terraces and low hills, more than 75 percent of the soils are well drained or moderately well drained. They consist of silt loams, mostly more than 4 feet deep, over a gravelly substratum. Permafrost may exist in the lower part of the silty materials, but it will recede to an even greater depth or disappear completely after clearing. In any event, it will be well below the reach of plant roots and will have no effect on plant growth. The soils may require irrigation, but adequate sources of water are available. These soils are physically excellent for crops, and past experience indicates that the growing season is long enough so that in most years, there would be no serious frost damage. Some of the associated, approximately 25 percent, are fully drained soils and lakes that are used by waterfowl, and this is in that 25-percent area of these upland areas. But again, because of the great predominance of well-drained soils, there would be little, if any, conflict between the two uses.

Mr. WILLIAMS. Go ahead, Bill.

Mr. REFFALT. Yes. I'd just like to point out, he was speaking of the Tanana Valley, which is not within this Yukon Flats Basin that we've been speaking to here. It's just outside of it and is, I believe, mostly within State-owned lands.

Mr. EPPS. He was speaking as a comparison of where the productivity came during the mining days. The soil areas he was describing have or were the Yukon Flats soil areas. The real value of the Yukon Flats is, indeed, its productivity, whether we're looking at it from an agricultural standpoint or a waterfowl standpoint that has been pointed out here. The Yukon Valley receives a higher incidence of insulation than any other place in the world, according to some of the recent work done by a Japanese university. In fact, it compares quite favorably from a growing standpoint, because of its very high insulation in a 24-hour period, to those latitudes that are very similar in Iowa and Illinois. The international value of the flats has again been pointed out with the ability of production of waterfowl, and this also falls into grain, because grain is one of those chief commodities that we, in the United States, transport. It's one the chief contributors to balancing the pay deficit—or the budget deficit we have, importing other energy sources at the present time. I'd like to speak to both of these for a moment and kind of address where some of the compatibilities, indeed, really are.

The Yukon Flats, as has been pointed out, is a major waterfowl production area, but it isn't one of the most significant ones on the North American Continent. In fact, when you take a map and overlay the waterfowl production areas of the Canadian Provinces on the northern tier States and then likewise overlay where the major grain producing areas in the North American Continent presently are, there's a very strong correlation here. I might suggest that we might increase the waterfowl production of the Yukon Flats by growing some grain in the area.

The other thing is the biology of the waterfowl, themselves. When they first arrive in Alaska, normally they rest for a period of time. The fact is, one of the intriguing things about the Tanana Valley is that when the agricultural area opened up down around Delta Junction, the waterfowl concentrations at the Fairbanks area dropped off considerably, because they stopped in the grainfields at Delta Junction. Then they move into the lakes. Those of you that are familiar with our lakes realize that they are sphagnum lakes, primarily, with the center of the body, of course, water and surround edge, filling in sphagnum moss, and some of us have had the experience of walking across this, and I can assure you, nobody's going to drive a tractor across it or a plow. The surrounding area, on most of the uplands of the Tanana or Yukon Flats, are sphagnum, black spruce ecosystems, climax ecosystems, primarily for martin habitat, contribute nothing to the waterfowl as far as a feed base or other aspects. While they're in here, there's a considerable period of time during the summer, they're moulting. They don't even fly, they don't even leave the area. They're confined to this water interface environment.

Now, let's move over to the grain production, itself.

One of the things that's quite often pointed out is that grain production is expensive in Alaska. Indeed, it is. It runs about twice what you can produce the same bushel of grain for or the same commodity, in Nebraska. The difference is, the yields are about twice or better than what you can produce in those grain-producing areas of the lower 48. Another interesting factor comes in here, and this is where it becomes a very interesting thing from the international trade aspect. It enables the Alaskan agricultural to differentiate its market. You can take the same seed, analyze it for protein content in Alaska—or that you've brought in from outside, it will run somewhere between 7 and 9 percent protein. Plant the same seed lot, grow it out to maturity, and analyze it for protein, it will jump up to 13 to 18 percent protein. This is significant. In fact, the agronomists tell us that we may, indeed, be able to reach 30 percent protein with our barley. That's approaching soybeans, and it has an entirely different aspect when you look at it from this standpoint. It also has a higher value. The use of fertilizers and pesticides, one of the unique things that we, in Alaska, have the opportunity to do, and it's one of the things that we're doing here, that's why we're sitting around this table, is we can do it right, and I think the State is demonstrating at the present time the way that they are approaching agriculture in Alaska. They've done a significant amount of work in a planning process in the Delta Junction area, they're covering all of the various bases, they're trying to eliminate all of the various incompatibilities.

I would like to point out at this point that one of the problems we run into when we start talking about these things, it's one of the things I really have a feel for Congress, is that when you're talking in generalities, we've got conflicts any place you want to go. You talk about mining, it's going to conflict with scenic values. You talk about scenic values, they're going to conflict with agricultural potential. But when you get down to cite specifics, when you get down to details, there really is very little conflict, and where there is, normally compromises are rather easy to arrive at. The point being, the State is not doing it wrong. The State is doing it very carefully, the State is doing the environmental studies, doing the background information, and the use of such things as pesticides, first of all, many of the pesticides are not approved by the USDA and EPA for use on some of the crops that are going to be used up here. This means that from an agricultural standpoint, we have to be ultracareful that we don't introduce some of the aspects that have been a problem below, and in addition, we don't have a high incidence of these kinds of problems in Alaska to begin with, because we haven't had agriculture to begin—to start with. The grain production as proposed for the Yukon Flats is a very key item and a very good item for that area. As I mentioned, it has transportation access at both ends and down the river. The grains are very easily stored. In fact, they could be harvested in the fall. They could be moved to barges or what-have-you, they could be stored there, and they could be moved out the following spring, right down the river. So access is an important thing, as it leads to this whole picture.

The mention of draining of the areas put forth here a little while ago, I'd like to point out that the areas that we're looking for agricultural production in the Yukon Flats are not the low areas. They're not the waterfowl nesting areas that are prime—or key, I guess is the term thay want us to use—but key waterfowl nesting areas that are on these maps. They're the uplands, the benches that were described here earlier to be between 60 and 400 feet above the waterfowl nesting areas, because this is where the vast majority of the agricultural soils are. One of the things that we need to take a hard look at, when we're looking at the flats, is because of its very high productivity from a number of things. It is a total resource management for full, true national interest and international interest. As I've pointed out, there is a differentiation between where the waterfowl nest and where the agricultural areas are. In fact, one of the criticisms of grain production at the present time is that it's a monoculture system. I submit that black spruce, sphagnum moss is a monoculture system and is probably, as I mentioned earlier, one of the more sterile environments that we have in Alaska, from a wildlife standpoint.

With the diversification of that environment, we will create tremendous edge effect and many of the more important subsistence resources and sporting resources and viewing resources in the form of wildlife are edge type critters. They like the edge. They will utilize this environment significantly. One of the things we have found in Alaska is when the colonists came into the Matanuska Valley, there were very few moose. When they cleared the land and began to utilize the fields, they got considerable moose, and they presently have moose in the Matanuska Valley. This will be a change in species. There's no question about it.

There is going to be a shift in the number of species there, but as has been pointed out, again, the black spruce, sphagnum ecosystem is primarily habitat for squirrels and the martins that prey upon them. I submit to you that within Alaska, we have a few acres of that kind of habitat beyond the 20 million acres of potential agricultural.

The land ownership pattern on the flats has been mentioned here and I think this is one of the more important things that Congress is going to need to address, not only on the flats, but maybe in some other areas. The fact remains that these people, at the present time, have a primary interest in subsistence, and this may continue for a number of years into the future, maybe 30 to 50 years. There may come a time, however, where they want some economic development, because there's a limitation to how many people within a village can subsist and those folks are going to have children and their children are going to have children, and eventually you're going to reach a point where subsistence is going to be marginal, you're going to have to find something for these people to do. As a result, they may, indeed, want to diversify their economy. One of the things I would suggest here is that from the national interest and, indeed, from the Native interest, there may be a need to look at land exchanges within this valley area so that you can maintain the integrity of this lower water area, which is the high waterfowl habitat area and is one of the key wildlife areas at the present time. With the upper uplands area, which is more suited to agricultural production, to timber production—incidentally, there's nothing wrong with tree farms either. They might be very effective in this area and they also would diversify the habitat. So that this would be a source of potential economic income.

You've got a surface exchange situation here, if you're talking about exchanging with the Village corporations. There may be even a need to address the subsurface exchange for either minerals or other uses. This may be something that needs to be considered. The other thing is that, to me, it seems a little strange that one of the prime uses, one of the prime justifications for the Yukon Flats for a wildlife refuge is, indeed, its waterfowl habitat, and nobody will argue that, however, that's a rather short period of time during the year. As has been mentioned here several times today, people do live on those flats year around and the damage that's done to the flats in the wintertime is very small. Those folks do a tremendous amount of trapping. You fly over that area in the wintertime and there's snowmachine trails all over that country. In the summertime, you'd never know they were there, so I think there has to be a recognition and consideration for what time of year these areas really need some protection and what are some of the changes that might be allowed during other parts of the year.

Mr. WILLIAMS. Let me ask you just to go back to the first, just so I'm clear. The gentleman who proceeded you gave us some figures on the precentage of Alaska lands, agricultural lands within the area, and then proceeded to explain the types of soil and what it was and, you know, composition. Now, the gentleman from the Fish and Wildlife Service indicated or asked if that was the Yukon Flats or someplace outside of the proposal. I didn't understand what you said.

Mr. EPPS. I'm sorry. The soils and the percentages that Mr. Clifford was describing were for the Yukon Flats. He was drawing a correlation between the kinds of soils there and those that have produced so well in the Tanana Valley. OK?

Mr. WILLIAMS. But he was describing the Yukon Flats?

Mr. EPPS. He was describing the Yukon Flats soils.

Mr. WILLIAMS. OK.

Mr. HARVEY. Any other comments? Yes, sir?

Mr. LAVENE. Dave Lavene, Alaska Coalition.

Mr. HARVEY. I'm cutting this off in about 3 minutes.

Mr. LAVENE. OK. I think if you could arrange to have the farming in the winter, there wouldn't be any major conflicts with the values we're seeking to protect. Very quickly, I think it's important to put the farming future of the Yukon Flats in economic and environmental perspective of the land status. Quoting from Wayne C. Thomas, associate professor of economics at the University of Alaska, he says,

> I am also in agreement with the D–2—that the D–2 lands controversy will have little influence on agricultural development in Alaska or lack of it for many years to come. There are significant quantities of good quality agricultural soils on State and private selected lands, and/or that Federal land not included in the D–2 classification. A wilderness designation and large tract of D–2 Federal land would not inhibit, by itself, agricultural development on the Slope.

Mr. HARVEY. You're reading from report No. 15 of the——

Mr. **Lavene**. No. 13 and No. 14, the assessment of Alaskan agricultural development.

Mr. **Harvey**. By the Land Use Planning Commission?

Mr. **Lavene**. Yes, I think that there's a—if my memory serves me correctly, there's about 17,000 acres under the plow right now in Alaska. The State has over a million acres already selected in the top 10 percentile of agricultural potential. That would provide for over a 50-fold increase in Alaska farming, without even touching any of the State, Native or Federal lands under discussion here today. We can submit some more information on that aspect of it. In terms of the environmental impact to farming in Alaska, very significant. If you take an overlay showing the medium density of the waterfowl habitats and put on top of that an overlay of where the prime agricultural soils are, there is a direct conflict there, and we can provide that map to the committee if you want it. The impacts go on and on. Even if there's—in some area, there may not be a direct conflict in space between bird habitat or other wildlife habitat and farming. The offside effects of farming would have a very significant effect. The roads, people in the area, runoff of farming, herbicides, perhaps pesticides, fertilizers, irrigation systems. The impacts go on and on and on.

I don't think we could cover them adequately here. I just—I think suffice it to say that this sort of rosy picture that was presented before, that there are very little conflicts on a site specific basis, that is not the case. Finally, in terms of the economics of farming in the flats, I would refer you to a study that was contracted by the Forest Service, done by the University of Alaska, Institute of Social and Economic Research and the School of Agriculture and Land Resources, called Yukon/Porcupine Regional Planning Summary. It says, quote:

> Several considerations cloud prospects for large scale grain farming in the region. Most important is economic feasibility. Barley would cost a little under $3 a bushel to produce and at least another dollar to ship to Alaskan tidewaters. This grain would not be competitive with west coast barley, presently bringing a little over $2 a bushel in any conceivable market. Even these costs assume substantial improvements and high volume transport lengths between the region and the Alaska rail belt.

Without going any farther, I'd just summarize by saying that if the State of Alaska were to develop a significant agricultural industry, it has sufficient land to do so in areas of lower conflict, with wildlife values and other national interest values in the Yukon Flats. Mr. Epps pointed out quite correctly, I think, that the value of the Yukon Flats is productivity and from the Alaska Coalition's viewpoint, right now is very high productivity of wildlife with very little human input. To go to large scale farming in the area would involve very expensive, economically inefficient human inputs for an output that there's no conceivable market for.

Mr. **Harvey**. Thank you. If your numbers are right, then, this won't happen anyway, so you don't have to worry about it.

Mr. **Lavene**. Well, somebody might decide to subsidize it, so we don't know.

Mr. **Harvey**. Then we'll add another 60-acre location. Well, we might add one more and then——

Mr. **Lavene**. No; I think I'll let somebody else do it.

Mr. CHILDERS. I just wanted to ask for a point of clarification. The gentlemen indicated that there was a—that the Yukon Flats had some of the highest insulation values in the State and approaching those of some areas in the northern midwest. I wanted to ask him what the relative significance is of that, as opposed to frost-free days was? I was under the impression that frost-free days tend to be a much more important limiting factor.

Mr. EPPS. It's a very logical question and that's a very common confusion with the life expectancy or the life cycle of many of our grain crops. The frost-free period is, too—within reason, is important. This is where we get our high protein, is because of the continuous daylight. It causes a—you don't have the cycling within the plant. In addition to that, it does require varieties that will mature in this period of time and the experiment station at Rampart, which is at the far west end of the flats, during the early part of the century, before we really had short day seasons—or short season grain crops, we never had a grain failure, and they were there in establishment in the early part of the century, up to about 1925. Today, with our shorter grain varieties, shorter season grain varieties, there's no problem. We won't have significant problems. We can just take advantage of that energy.

Mr. HARVEY. Let's move on to the non-Federal land situation. We discussed it to some extent, but go ahead, Jim. State and Native selections.

State and Native Land Selections

Mr. WICKES. Jim Wickes, Department of Natural Resources. In terms of State interest lands, first within the Udahl proposal boundaries, there are roughly 1.8 million acres. These chiefly lie immediately to the south of the—they all lie pretty much south of the Yukon River. Reference Area No. 43 on the State selection interest map, proceeds along the State highway, adjacent to the State lands, through the communities of Central and Circle, at which point they—the interest area crosses the Yukon River to the east and extends south a few townships to encompass some good agricultural land. In this way, the State has identified land which has a multiple value of the kind of the State's interest in selecting in. It's on a transportation corridor, already established, overland highway, the State highway. There are hard mineral values, there are forestry and agricultural values along the highway of moderate potential. They cross over the river and go up on the eastward side. You come into some of this very productive or potentially productive agricultural land. The State purposefully stayed out of—attempted to stay out of the very productive, biologically speaking, Yukon Flats bird area in this selection area. On the western side of the flats, along the haul road corridor, our reference area No. 48 on the State selection interest map, is a considerable amount of land identified for possible State selections. Again, it is important in this proximity to establish a transportation corridor, namely, the haul road. It goes up across the Yukon River and in the higher terraces, again encompasses some potential agricultural land. This is essentially the extent of the State's intrusion into the Andrews proposal of the Yukon Flats area and again, I'd like to stress that we have made a conscious effort to stay clear of these areas where there is potential conflict, even though the agricultural potential is fairly outstanding.

Another point just to the south of the—another area of the State's selection interest just to the south of the Andrus proposal is the White Mountain area, wherein lies the Beaver Creek wild and scenic river proposal. The State is primarily interested in this area.

The White Mountain area has—the primary interest of the State in that area is as an addition to the State parks system. It is fairly close to the community of Fairbanks, a growing urban center in the State. It is also fairly close to existing highways and it is part of the overall State parks system plan. So these three areas pretty much round out the State interests in this general vicinity. In terms of——

Mr. HARVEY. Jim, let me ask you a quick question on the White Mountain area.

Mr. WICKES. Right.

Mr. HARVEY. Are you saying that if the State did get title to those lands that they will be made a State park?

Mr. WICKES. I'm saying that's our intent in identifying these. There are some steps from the selection process to the actual dedication of lands for that particular purpose.

Mr. HARVEY. Are those included in an act of the State legislature?

Mr. WICKES. Yes. In an area of that size, it would include that, that's correct. In terms of Native interests in the area, presently selected are about 3.9 million acres within Andrus boundaries for the Yukon Flats, of which some 2.6 million acres, we expect to remain in place after the overselections are dropped. That represents some 23 percent of Mr. Andrus' Yukon Flats proposal.

Mr. HARVEY. Any more comments about Native selections?

Mr. WILLIAMS. My turn. Dave Williams, Doyon. Dick, can you flip that baby? I guess we all count differently. On what we call the flats, we've got 2.2 million acres. That's the villages, the village blocks on the Yukon Flats. Arctic village of Enakai has 1.5, which brings us up to about 3.7. That may be the—where the difference lies there. And then, of course, there's the Kandik, which I already gave you, at 3.2.

Mr. HARVEY. It appeared as though the State representative nodded when you said that is probably why there's a difference.

Mr. WILLIAMS. 3.2—Well, the Kandik, we've already mentioned the Kandik. I think the area of concern to us now is the area above the black line that I drew in over there that shows the divide between the Kandik and the Black—the water shed of the Black River, so you're looking at a portion of—a significant portion of the

Kandik block, plus the areas around these villages. Hard rock minerals in that area, we really don't have much. We've got three prospects on the Kandik over on the other side of the black line. One zinc, two lead/silver, and I'm not going to get up and do my thing again on them. In the Flats, of course, the Flats is an oil and gas basin that's a separate basin from the Kandik and I'll refer to the oil and gas people to discuss that more. We've put in three wells in the Kandik. We've got a lot of feet of postholes that we'd be willing to sell, if anybody can figure out how to get them out of the ground. But we're not throwing up our hands and walking away either. The—in the Flats, of course, we haven't done any—gotten into any exploration activities yet. We are looking at the day that we will go into exploration activity, and we have started by going into the villages on the Flats and conducting a survey of the village people, providing them with maps of the areas, not only that the village corporations will own, but that Doyon will own, asking them to delineate areas that they might see problems, if we were to go into an oil and gas operation in the Flats.

There's a concern whether we find—whether or if we find oil in the Kandik or if oil or gas, or if we find oil or gas in the Flats, then getting the stuff out. Now, admittedly, the Kandik, we could come south and through Circle where that big Kandik block joins into the Circle—those withdrawals. The other Flats villages, we couldn't do that. Somewhere, we're going to have to cross the wildlife refuge, if we find anything in the area and it may be that if we found production, say, in the northern Kandik, that it might begin to be economically more feasible, maybe even environmentally more feasible if we got production in the northern Kandik and production in the Flats villages, to come across the Flats rather than to swing one line out of the Flats and one line out of the southern Kandik access to the Kandik. I think these things need to be given consideration.

Now, the way H.R. 39 is written, if anything ever happens in the Flats, we may be the only one that could do anything on the Flats, because that basin is exempted from the Oil and Gas Mineral Leasing Act and is precluded from leasing under the Leasing Act—under H.R. 39. That would lead us to the probability of potential that we couldn't find the quantities of oil and gas on—in our holdings in the Flats, but it would allow us to build a supportive pipeline off of the Flats. Being cognizant of this and also being cognizant of the fact that energy fuels are very expensive in the villages, we have plans on the back shelf for if we find any production, production that's not economic, to move out of the region to go with the small refinery if we find oil and gas or oil or small gas finds, if we get gas, to at least supply the villages on the Flats. Very similar to what the Navy has done with Barrow, out of the Umiat gas field.

We think that this is—could be a viable thing, if we can find oil and gas, and it could be of help to the people in the Flats. We don't feel that an oil and gas operation on the Flats is going to, if done correctly, significantly affect the subsistence resources. Right now, as I say, we're interviewing the people to find out what their feelings are and the areas that they feel are particularly sensitive. We think that if we could get a small oil and gas industry going on the Flats, if just to supply the Flats, it may not make Doyon a lot of money, it may not make Doyon ever a lot of money, but it would help a significant portion of the people within the Doyon region. These are the things that, when we get our economic inputs, rather perturb me and lead me back to my thing, that you can't look at the economics in light of 365 million acres. The same way with the timber industry on the Flats. I'm—we haven't gotten that far into the timber, we haven't gotten that far into agriculture. We know it's going to take a long time for the culture to change to the point where the people are ready to and wanting to accept it. We also feel that the day may come that they will, but I, again, was kind of saddened to find out that our timber really wasn't worth anything and it, again, kind of surprised me, because we've had people out of the Pacific Rim countries coming to talk to us about that very timber that isn't worth taking out. And I—and again, if we take the timber out, we're going to have to have a way of getting it out. Our timber, if we develop—if the timber industry for export were to develop—if Federal timber were available, we'd probably have a more economic operation than we have.

Mr. HARVEY. Thank you. Let's go on to the energy values.

Mr. HESSION. Mr. Chairman?

Mr. HARVEY. Yes?

Mr. HESSION. I'd like to talk briefly about the State selection interests. The Alaska—Jack Hession, Alaska Coalition. The Coalition does not share Mr. Wickes' testimony of a relatively small conflict, particularly with regard to the Hodzana Highlands and the White Mountains. These two uplands in particular are water sheds of the Flats and the reason, the basic reason why the Coalition and, to some extent, the administration included them in the Yukon Flats proposal is that we wanted to attempt, at least, to ensure the ecological integrity of the entire unit. It has obvious water quality implications if you—for the Flats, if you devote the uplands to noncompatible uses. Beaver Creek, a wild river, in the administration's proposal would simply be canceled out if the State were allowed to select in the White Mountains unit. As for the—pardon me?

Mr. HARVEY. Why? Yes, why?

Mr. HESSION. Why what?

Mr. HARVEY. Why would it be canceled out if the State were allowed to select around it?

Mr. HESSION. It would be State land and therefore, it would cancel out the wild——

Mr. HARVEY. No, I was thinking that if the last Congress made Beaver Creek into a wild river and the State selected the rest of the area in the White Mountains.

Mr. HESSION. Oh, well, perhaps I'm not making myself clear. What I intended to say was that if the State selects the White Mountains, it, therefore, is no longer Federal land and therefore, they can do anything they want with it. That was my point.

Mr. HARVEY. Yes, but we can still have a Beaver Creek wild and scenic river there.

Mr. HESSION. Certainly, but——

Mr. HARVEY. Which had been created before the State—it was titled back to the State.

Mr. HESSION. Yes, but the State has identified those lands for its interests and in the event that Congress agrees with that, there goes the wild river.

Mr. HARVEY. Oh, of course, yes. OK. I understand.

Mr. HESSION. Just so we understand that.

Mr. HARVEY. Oh, I understand, sure. What you're saying is, if Congress decides not to make it a wild and scenic river, it won't be a wild and scenic river.

Mr. HESSION. Well, no, if Congress decides—if Congress decides to yield to the State's interests in that White Mountain unit, they would thereby, in effect——

Mr. HARVEY. Well, it seems to me that Congress could make—could adopt Beaver Creek as a wild and scenic river, but at the same time not say that they would put all the surrounding area into the Yukon Flats wildlife refuge or whatever it is, and the State could then select them, and you could have both.

Mr. HESSION. Right, there's no doubt about that.

Mr. HARVEY. OK. I understand.

Mr. HESSION. Let me mention that the State's argument is that it would be held for possible State park purposes. I think the committee should note that the State legislature hasn't created a State park since 1972 and in terms of our discussion the other day. the Wood River, Tickchick State Park proposal has been pending for far longer than that. In my opinion the State legislature is not about to do anything along these lines, given the current (d)(2) controversy, and then, of course, the moment the land is conveyed to the State on an interim basis, it's wide open to location under the State's 1972 mining law. We just had a uranium rush in the upper water shed of that very creek, and then, of course, on the horizon, there's the possibility, at least, that the Burn initiative will carry in November, at which point all unreserved, vacant, and unappropriated State lands are wide open to staking. It would be an Oklahoma style land rush and that's the reason why the coalition strongly feels that these two uplands should be considered an integral part of the Yukon Flats proposal. Thank you.

Mr. HARVEY. Thank you, Jack.

Mr. REFFALT. Bill Reffalt, Fish and Wildlife Service. The Fish and Wildlife Service has made an analysis of the State land—indicated land selections in this area and I don't have a copy of that report with me, but I'll be very happy to provide it for you back in Washington.

Mr. HARVEY. I'd like to cut this off here and move to energy values. AOGA?

Energy Resources

Mr. HARTMAN. Don Hartman, for Alaska Oil and Gas Association. The Yukon Flats is underlain by a sedimentary basin and as Jim pointed out, the area of the basin—it's a big basin. It covers 10 million acres. It's 160 miles from east to west and 100 miles from north to south, and from what geophysical information is available, we can interpret that there is a probability of great thicknesses of sediment of tertiary and probably Cretaceous Age, which are capable of generating oil and gas. The basin is unexplored except by a very scanty amount of geophysics, and there aren't any outcrops to go by, and no wells have been drilled in it. So it's essentially about

99 percent untested. We would urge that some kind of multiple-use arrangement be alloted to the Yukon Flats, so that it can be explored and perhaps developed for oil and gas production. To the east, the—a significant part of the refuge covers the Kandik Basin, which as Dave pointed out has been tested by three wells within the past 2 years, none of which were successful, but that's a very small percentage of pit wells in an area of 8 million acres and again, we would urge that access be maintained for additional exploration and possibly production of oil and gas in the Kandik Basin.

Mr. HARVEY. OK. Thank you. Are there any more comments on energy resource values? Yes?

Mr. BARKER. Jim Barker, Bureau of Mines. The Yukon Flats has been identified as a potential area for sedimentary uranium. I can't really draw any neat circles around this at this time, nor can I show you any occurrences. I think, though, that the area around the northeastern fringes of the Flats should be given consideration for this. The physical geology along the Porcupine River, with tertiary sediments and volcanics, overlain by lava flows, would be feasible for this type of mineralization. Also down river below the flats, toward rampart, there are known coal occurrences. This coal was used in steamers during the mining days. The coal is thought to be of a subbituminous grade and probably occurs in thin beds. However, it could serve as a local source of coal for villagers in that area.

Mr. HARVEY. Yes, go ahead.

Mr. HOFFMAN. Barry Hoffman, Alaska Miner's Association. I'd just like to address a couple of things. It already has been mentioned, the uranium staking in the Beaver Creek and Birch Creek areas and these are substantial new claim blocks. Very little information has come out on the occurrences, except they are in intrusive and crystalline terrains. I'd also like to mention the new occurrence near Circle Hot Springs. It's a possible sedimentary type uranium. We believe this is a very unexplored area for uranium, but it has potential significance, particularly considering the road access into the area.

Mr. HARVEY. Thank you. Yes?

Mr. MULL. I'm Gil Mull with the Geological Survey. In 1975, the Branch of Oil and Gas Resource Appraisal Group conducted an assessment of the oil and gas resources in the entire United States and as a part of their assessment, they generated some figures on what they would estimate to be the unexplored, undiscovered recoverable resources for the entire Yukon/Porcupine Province, which would include the Yukon Flats, plus the Kandik Basin. Their figures suggest a range of oil from zero to 400 million barrels of oil, with a most likely of perhaps 100 million, a fairly small resource on that assessment. In terms of natural gas, from zero to perhaps as much as 2 billion cubic feet of gas, with a most likely of perhaps about 400 million—excuse me, 400 billion. Again, based on this assessment, a fairly small figure. We would not be tremendously optimistic that there would be a tremendous resource involved in this area.

Mr. HARVEY. Anything else on energy?

Mr. **Stenmark**. Richard Stenmark, Land Use Planning Commission. Several years ago, the entire Yukon Flats was withdrawn as a power site classification. There's a hydroelectric site on the Yukon below Stevens Village, known as Rampart, which has the greatest potential of any major site in Alaska for development of hydropower. The reservoir would essentially flood the entire Yukon Flats lowlands.

Mr. **Wickes**. Jim Wickes, Department of Natural Resources. With Mr. Williams permission, I'd like to give a statewide perspective on the oil and gas potential. Our figures indicate that there are some 6 million acres within definable oil and gas basins, covered by the Andrews proposal. Most of which—all of which, in—excuse me. Most of which fall below the 4th level, from the 5th to 10th. It's basically not of the highest potential on a statewide basis. In terms of uranium, our figures generally confirm the previous testimony that there is a sedimentary basin with some potential uranium find, but it's highly speculative information at this point.

Mr. **Harvey**. Thank you. Let's go on to the hard rock mineral area.

Nonfuel Mineral Resources

Mr. **Barker**. Jim Barker, Bureau of Mines. We can start with the Birch Creek area, a relatively small withdrawal in the proposed lands. It nearly encircles a mining district, in which currently about 80 people are employed. There could be a conflict here.

The district has produced about 277,000 ounces of gold to date. In addition to the placer gold, we recognize an area of high mineral potential which infringes upon the withdrawal at the northwesternmost extent. This is in the area of the north fork near the Steese Highway. We have identified geochemically anomalous amounts of tin in that area. In the Beaver Creek area, there are several areas of high mineral feasibility in the immediate vicinity of the river. The western one is a matic ultramatic complex, which contains several occurrences of mineralization. The USGS has identified anomalies there. At one site, there have been several staking efforts. I believe the claims are active at this time. The geochem chemical survey that we conducted this past 2 years in that region has indicated anomalous values to be fairly widespread. We also identified an occurrence of copper and asbestos along the river, itself. The central portion or the White Mountain section of the Beaver Creek area is considered to have a high potential for tin, uranium, molybdenum and a few other elements. They are not in the withdrawal but the need for access to the west or to the Elliot Highway, should be addressed.

Along the southern fringe of the Yukon Flats, the sedimentary rocks in the Crazy Mountains and some of the other hills that fringe these Flats have a high potential for zinc and lead mineralization. We've identified an occurrence of zinc along Preacher Creek that could be an example of that type of deposit. Moving to the northeast along the Porcupine River, the very northeastern portion of this withdrawal, formerly referred to as the Porcupine National Forest, contains a granite area known as the Old Crow Pluton. A metamorphic complex surrounds it. We've completed 2 years of intermittent field work in that area. Previous to that, there was very little known about the region. We have a draft report in preparation for publication at this time on the region.

The assessment has indicated that this granitic region might be favorable for several types of mineralization. One would be uranium and tin deposits. These would occur as veins and disseminations within the granitic rocks. An example of this, would be the uranium that occurs in township 32 north and 29 east. We also suspect uranium to occur in township 33 north and 29 east. Base metals are known to occur on the fringes of this granitic pluton. We've identified scarn and stock quartzite deposits, with one showing copper and lead for about twelve hundred feet of strike length. That's in township 31 north and range 29 east. Potential has also been recognized in the area for placers of tin, tungsten, rare earth elements and uranium. As an example, we would indicate the upper two thirds of the Rapid River, which from our studies is indicated to contain extensive placer deposits of these minerals. The grade could not be determined without extensive drilling or test pitting. Along the Porcupine River are high bench channels. These are ancient channels of the Porcupine River; several miles from the border, a 3-mile section of this ancient channel has been identified to contain tin placer mineralization. In the Porcupine region, another geologic environment highly favorability for mineralization is the sedimentary and the lower Paleozoic sedimentary rocks that make a great arc into Alaska from Canada.

Mr. Harvey. Are you running up the Porcupine on this, all the way to the Canadian border?

Mr. Barker. Yes. Right now, I'm addressing the area of the Porcupine National Forest and its eastern half. We've identified several areas of high favorability for mineralization in a good rock sequence. I'd like to point out that although I can point to several occurrences, the area is in no way fully evaluated, because our studies were limited pretty much to the Porcupine River, itself. Township 30 north, 30 east, near the mouth of the Koyukuk is geochemically anomalous and several minor occurrences were identified. Also near the mouth of the Colleen River is considered to be a highly favorable area. Near the northern side of Colleen Mountain, there's favorable structural setting and geochemical highs of copper and lead. The northwestern portion of the former Porcupine proposal includes some matic rocks that are very poorly known at this time. We can't really address them as to their favorability on a ranking system. However, mineralization has been identified at several sites outside of the withdrawal areas. Within the withdrawal area, we examined a site of copper and barite mineralization in township 31 north, range 22 east, where a number of structural linears intersect. I think that area should be considered highly favorable at this time. There is a gold placer on Procrastination Creek, a tributary to the Colleen River, immediately north of the withdrawal. I would consider that as a type example of another form of mineral deposit that should be considered in the area.

I would like to summarize. The number of occurrences which can be identified with a minimal amount of work lends credibility to the assessment of those portions of the area I referred to as having a high potential for mineralization.

Mr. HARVEY. Any other comments on the hard rock minerals? Dave?

Mr. DAPKUS. Dave Dapkus, Heritage Conservation and Recreation Service. One point of clarification on Beaver Creek and the mineralization there. On the access, the way most people presently get in and I would assume would get back and forth to the highway, in no way involves the river proposal. It's above it.

Mr. BARKER. I'm referring to the area of Great Bend. That region has a potential access route for development type operations in the interior of the Beaver Creek withdrawal.

Mr. HARVEY. Yes, go ahead.

Mr. HOFFMAN. Barry Hoffman. I'd just like to add a few additional comments, particularly on the White Mountains. It is geochemically anomalous in lead/zinc and there are some lead/zinc occurrences as yet undescribed in the literature. Also the whole belt of rocks along there is quite anomalous geochemically, and copper, lead, zinc and several other elements. And there has been relatively little exploration in this area, even though it is close to a road system. Some of the types of deposits that will occur there are just coming in favor now, geologically and economically, and this area will receive much more attention in the future and generally, the same thing can be said for the Porcupine area. Most of the area has been withdrawn in the period of time that people would be up there looking for certain types of deposits and again, just to state what little work has been done up there and some of the occurrences that have come out, it shows a potential up there that's really hard to estimate, but it appears to be very significant.

Mr. HARVEY. Any further comments on the hard rock minerals? Yes?

Mr. WILLIAMS. We really passed it by. On the Rampart section of the Yukon, the new Rampart of the existing Rampart Village in Tanana, we—there is a deficiency withdrawal that is isolated by that wild and scenic river proposal. We've got four drillable prospects in it, and you've heard what commodities there are. Thank you.

Mr. HARVEY. Thank you. Yes, Jim, go ahead.

Mr. WICKES. Jim Wickes, Department of Natural Resources. The State has identified, via its 1977 hard minerals analysis, some 4.8 million acres within the Andrus Yukon Flats proposal that has some potential, however, all of those acres rate out in the bottom 60 percent on our scale of 10. Thank you.

Mr. HOFFMAN. I'd like to just make one more comment on that. Again, it depends on what data you put into the computer on what you get out, and I'm sure you don't—you realize, you don't have all the data and if there's new data that goes in, definitely, that will change it. But also, one area I forgot to mention, and this is the northeastern portion of the Yukon Flats withdrawal and again it's an area—This is considering the pipeline corridor and to the east.

Again, there's been very little exploration, but there have been some mineral trends come out——

Mr. HARVEY. You mean northwestern, I guess?

Mr. HOFFMAN. No; the pipeline corridor and then to the east.

Mr. HARVEY. Well, wait a minute now. Which pipeline corridor?

Mr. HOFFMAN. Well, the pipeline.

Mr. HARVEY. Well, that is actually the northwestern portion of——

Mr. HOFFMAN. That is the northwestern corridor.

Mr. HARVEY. It's the northwestern portion of the Yukon Flats proposal.

Mr. HOFFMAN. Right.

Mr. HARVEY. I thought you said northeast.

Mr. HOFFMAN. Well, OK, what I'm talking about——

Mr. HARVEY. Over by the Trans—by the Alyeska pipeline?

Mr. HOFFMAN. That's right. OK. I'm talking about that area and to the east.

Mr. HARVEY. I understand. All right. Go ahead.

Mr. HOFFMAN. OK. There have been some new occurrences come up, a tungsten occurrence to the actual north of the withdrawal, but again with the little amount of work that's been done in that area, I think it should be pointed out that there could be significant mineral resources in there and particularly tungsten, which is one that the United States is lacking now and we should consider that as an important resource.

Mr. HARVEY. Any other comments on hard rock?

Mr. KLINE. Yes. Mr. Chairman, Bob Kline, with the Department of Natural Resources. A couple of days ago, Mr. Silver asked us to try and get our resolution a little bit better on the hard minerals for the whole statewide for the whole State, to produce maybe some estimate of how much minerals could be in the parks and preserves and how much would be outside of them. We produced that document and I'd just like to read the—read it into the record, and I could summarize it very quickly if you're interested.

Mr. HARVEY. You may summarize it.

Mr. KLINE. OK. The title of the document is "Statewide Resource Summary Showing Resource Availability within the Andrus Parks and Refuges and Udall National Forest Wildernesses," because that's the only ones we had for Udall. Just very quickly, without trying to make any policy statements on what's going to be open and what isn't going to be open, if you add up the estimated final Native holdings, the present State lands, plus the State interest lands, (d)(1) lands, present national forests, plus the utility corridor, you come up with approximately 63 percent of the 189 million identified lands in the State of Alaska with mineral potential.

Mr. HARVEY. And 63 percent would be what? Open?

Mr. KLINE. Would be—I'm not making any judgments on what's open or closed, I'm just saying that if we add up——

Mr. HARVEY. Outside or inside?

Mr. KLINE. If you add up the State, the Native, the (d)(1), the present national forests, the utility corridor——

Mr. HARVEY. That equals 63 percent?

Mr. KLINE. That equals 63 percent of the 190 million acres identified in the State. If you add up——

Mr. HARVEY. National forest, though, but didn't you—you said you were including the national forest wilderness proposal.

Mr. KLINE. I'm sorry, that's the national forests, minus the wilderness.

Mr. HARVEY. Minus the wilderness, all right. I just wanted to get that clear. I'm sorry.

Mr. KLINE. OK. Adding up the national forest, wilderness areas, present and Andrus proposed refuges, present and Andrus proposed parks, Andrus preserves, NPRA and military withdrawals in the State, you come up with about 34 percent of that 190 million acres.

Just two other quick things. If you take our first two percentiles, which include about 31.5 million of the best acres in the State for minerals, the State would end up with about 11 million of those acres and it—within the present parks and Andrus proposed parks, there is approximately 6 million acres, so there's a fairly significant amount of high value minerals that are in the present parks within the Andrus proposal.

Mr. HARVEY. Thank you. Any other comments on the hard rock? We're about to run out of tape. We're running out of time, and we've had a lot of comments on transportation and access problems, what's going on. I would ask anyone who has further comments, they are to submit those for the record on this portion. We'll take about a 5-minute break to change the tape and come back with the Arctic Game Range additions.

ARCTIC GAME RANGE EXTENSIONS

Now, we'll come back to order. Let me suggest that as we start into this, that a number of the statements and comments that have been made prior to this time have, I believe, gotten into, understandably so, the area of the proposed additions to the wildlife range on the eastern side, along the Canadian border. For those who are giving us some overall information, if you gave us the same information before, just let us know that so that it's indicated that it's the same area. Focus your remarks, if you will, on the additions on the western side of the proposed addition and again, we're short on time, but—so let's try to avoid redundancy here. If you agree with what somebody said, say so, and if you disagree, then that's fine. Say that, too, and indicate why. Let's proceed with the explanation and description of the area by Dick.

Mr. CHILDERS. Mr. Harvey, did I understand you to say that you wanted us to limit our comments to the extensions and not the existing range, is that correct?

Mr. HARVEY. What would your limit be—talking about, on the existing wilderness designations?

Mr. CHILDERS. Yes.

Mr. HARVEY. And the North Slope.

Wait a minute. I—you didn't identify yourself, sir.

Mr. CHILDERS. I'm sorry. My name is Bob Childers. I didn't quite understand what the ground rules you were trying to establish earlier on when you said——

Mr. HARVEY. Oh, I did not mean to exclude the possibility of talking about a possible wilderness designation for the Arctic Wildlife Range, because I believe we do have one piece of legislation, anyway, that proposes to do that, and someone said something about the North Slope. What did you mean by that?

UNIDENTIFIED VOICE. Well, the north part of the range, the wilderness designation.

Mr. HARVEY. Oh, yes.

Mr. STENMARK. Richard Stenmark, Land Use Planning Commission. The area we want to address, besides the existing range and any pertinent information there relating to the wilderness designation, would be the area to the west, primarily south of the State lands in this area, over as far westward as the divide at the utility corridor and the lands running southward, then, to the block of State lands around Chandalar, Big Lake area, back over to the Venatie Reservation and around it, around the Old John Lake area and abutting back into the Arctic Wildlife Range in here. Also if anybody feels they didn't quite address any particular thing just south of the refuge in this area, that would be appropriate.

Mr. HARVEY. Thank you, Dick. Let's hit the scenic, landscape, et cetera, values first. Dave?

Scenic, Landscape, Historic, and Archeological Values

Mr. DAPKUS. My name is Dave Dapkus, Heritage Conservation and Recreation Service. I'd like to mention just three rivers that are within the addition. On the south side first is Sheenjek, which has been talked about a bit, but I'd like to address two of the main values of it, and one is just its recreation value. I believe it's probably the most heavily used—presently heavily used river in the Eastern Brooks Range, either north or south of the divide. It's a pretty good family float and while floating it, you can enjoy one of the other values of the area and that is its scenery. It's very diverse, with big mountains in the back and meadows, forests and eventually flats, as you go along the river. Others will talk about its wildlife. That's just another one of its values. It's varied and lots of different animals. I won't go into it any further than that. To move over to the Wind River, the Wind is a drive which is also scenic. Here again, in the mountains, lots of big rock exposures in the uplands, in the upper part of the river and then changes to a spruce forest in the lower part, which adds a diversity to the scenery. Recreation is a little different in float boating than the Sheenjek. It's mostly class two and some good class three water in it, good for the experienced boater, and here again, as in all the range, it has its variety of wildlife that adds to the river's values and then the third one, real quickly, is the Ushak. It's the only one we propose on the eastern side. It's also a North Slope river. It's a fairly easy float. It's two, I think, big values. One is its geology in a scenic sense, extensive rock formations, the starkness of the area, which is very beautiful. It also has hot springs along it that are interesting, and the glaciation.

The second thing on wildlife, only one part of that, although all of it adds to the value of the river. I think we should talk about the raptors there that are easily seen and very plentiful, the peregrine in particular, the golden eagles, roughleg hawk, deer falcons, owls and so forth. All these things make the Ushak an outstanding river. Thank you.

Mr. HARVEY. Thank you, Dave. Any other comments on the landscape values of the area? Yes, sir?

Mr. THAYER. My name is Abel Thayer, Fish and Wildlife Service, and I'm speaking of the eastern portion of the Brooks Range. The scenic and archeological values, the wildlife values there, are compressed and unique, because the northeastern corner of Alaska is where the mountains of the Brooks Range are both the highest and the most northerly, so that the continuance from the Yukon Flats forest, north through the mountains to the Arctic Ocean and the estuaries, is compressed into slightly more than two degrees of latitude. The scenic values, then, are the result of a very rapid elevation change from north to south, very steep and appalling bluffs. Swift flowing rivers that are more deeply incised than to the west. It has, in general, high archeological values, because people have, for centuries, traveled east and west along the coastline, hunting and trading, and north and south through the mountain corridors, hunting and trading. There is a history of the area, but almost all of it is buried within the archeological sites. There is a short written history, dealing primarily with the whaling days and the very earliest biological explorers. That's all I have.

Mr. MILLS. Wilbur Mills, Alaska Coalition. Since 1968, I've spent about 9 summers, portions of 9 summers up in northeastern Alaska, adding up to a total of about 16 months in the field. I've hiked and kayaked extensively on both the North and the South slopes. I'd like to talk somewhat about the North slope, mainly the existing wildlife range, that is, the only portion of the North Slope that is in the proposal, in the light of consideration for a wilderness. In regard to scenic values, if you examine a map of the North Slope, it may not be apparent that there are significant scenic values there, but I think one has to consider the total unit, which means that's the area northward and also the area southward toward the Brooks Range, and in this light, I think this area has very, very high scenic values and as Abel just said, it is in this region that the mountains of the Brooks Range come closer to the Arctic Ocean and some portions, I think near the Canadian border, that are within 15 miles of the ocean, and so this makes very, very dramatic views looking across the Arctic Coastal plains, across the Arctic Foothills, toward the high peaks of the Brooks Range and especially the Romanzoff Mountain area. This is really significant, because you get long sweeps of rolling tundra and flat lands, above which rise these dramatic snowcapped peaks, and they rise up in that area, almost 6,000 feet, very, very steeply above the surrounding landscape, which gives you a very, very beautiful view of this country.

Another area, I think, which is also very unique is this area north of the Sadlerochit Mountain Range and the Sadlerochit Mountains are over near the western boundary of the range, near the Canning River and they extend in an east/west direction, and north of the Sadlerochit, there is an area of very, very fine Arctic foothill country and the Kakakterak River has cut a significant canyon right through the Sadlerochit Range and also through the plateau that lies just to the north of it, and here we have a very fine sample of Arctic foothill country. Again, as Dave mentioned, the unique thing about this is that within a distance of less than 200 miles from—right from the Polar Sea, southward across the Coastal Plains, across the Arctic foothills, into the Brooks Range Mountains and then out over the Arctic Divide into the South

Slope interior forest region. In less than 200 miles, you have compresed this tremendous variety of land forms and there's only two places, I guess, in all of Alaska where such a variety is compressed into such a short distance and this is one of them, and this is the only area in the Arctic where you have this variety of land forms compressed into such a short distance and so this makes this part of the wildlife range especially unique. As far as wilderness potential of this area goes, I think it is extremely high. It is the only area of the entire Alaskan Arctic Slope which is still in a relatively pristine condition and this has become obvious in just taking a flight from—flying, say, westward from the wildlife range, across the Canning River. You immediately notice the difference in the landscape of the wildlife range, except for some oil barrels along the coast and litter, the small areas of littering.

This—the landscape is pristine, whereas across the Canning, you run into seismic lines, aircraft—aerials, airports, you know, gravel roads and all these developments associated with the oil exploration area, so it is unspoiled and it is significant in that regard from a wilderness standpoint. And also I might mention that it is the only portion of the entire North Slope foothills and claim country that is mentioned for protection in the House subcommittee bill and in the Andrus bill, so there is—if this area does not get some degree of protection, the entire Alaskan Arctic North Slope could be opened for development.

Mr. HARVEY. Are you referring to protection over and above the fact that this is game range right now?

Mr. MILLS. Right. Some strong degree of protection. Just the fact that it's in the game range, I don't think would necessarily mean that there could not be development.

Mr. HARVEY. Did you have a comment on the scenic and landscape values?

Mr. MORGRIDGE. I'd just like to ask a question. Dean Morgridge, AOGA. Maybe Wilbur could answer this. I've been wanting to ask this question for some time and I think this is a good time to ask it. We're dealing with the northeast corner of the State, and I wonder if you could give us some idea of what it costs to get out into this area, how you go about it, whether you take a commercial airlines or where you use charters, and what it costs to get in there and get out, and also if you have any idea of how many people have been in the wildlife range this last summer?

Mr. MILLS. Well, let's see. Should I go ahead and answer it, or——

Mr. CHILDERS. Yes, I'll do it. I'm Bob Childers. I'm also with the Alaska Coalition. I was involved in the Rangeford study, sponsored by Alaska Natural Gas, for a little over 18 months in 1975 and 1976 and a copy of that report, the preliminary report, which is as far as it ever went in the House——

Mr. HARVEY. Yes, we're aware of that.

Mr. CHILDERS. It seems that their efforts were terminated prematurely, as far as they were concerned. The cost of entering the range in 1960 varied from $260 for a trip, essentially going the full length of——

Mr. HARVEY. Did you say 1960?

Mr. CHILDERS. I'm sorry, 1975.

Mr. HARVEY. OK.

Mr. CHILDERS. For a hiking trip going from Arctic Village to Barter Island. The reason why that's the least expensive is essentially because both those places are served by commercial airlines and that accounts for $125 in air fare, $125 in miscellaneous food and equipment, and that's it; $250, excuse me.

Mr. HARVEY. Is that round trip or one-way?

Mr. CHILDERS. That's round trip, you get to come back.

Mr. HOFFMAN. How long did that take?

Mr. CHILDERS. People generally want to go slow, but a minimum would be 2 to 3 weeks if you're really hurrying. I think it would be a little longer. It takes a lot longer to cook and take care of camp, plus time out in the field. It went all the way up to well in excess of $3,000 for guided hunters, including all fees and so forth. When you start flying into selected areas, using private aircraft for an unguided hunt, which is fairly common, that's only marginally more expensive, about $260 to $270. When you start involving charters to go into hiking and camping in particular areas, we estimate that base prices run around $340.

Mr. HARVEY. Did you have a comment?

Mr. THAYER. Abel Thayer, Fish and Wildlife Service. I would like to make the point that when you go to Barter Island or Arctic Village to go on a recreational hike, the cost of the air fare is not unique to that hike. It doesn't matter why you go there, you pay *x* dollars and——

Mr. HARVEY. Well, we're getting into an area a little far afield of the scenic and landscape values.

Mr. THAYER. Well, all right. I agree. I just wanted to——

Mr. HARVEY. It's not your fault, but——

Mr. THAYER. I wanted to make that single point.

Mr. HARVEY. We'll cover that under transportation and access.

Mr. MILLS. Is recreation included in this?

Mr. HARVEY. Yes.

Mr. MILLS. Well, I just might add to that, I just finished figuring out a budget for a trip and this type of trip would be one of the more expensive ones to make within that area of the wildlife range and it involves floating down the Canning River, and—which means you have to charter both there and back, as well as transportation—commercial transportation from Fairbanks, and we came out with something like $380, per person.

Mr. HARVEY. Go ahead.

Mr. CHILDERS. OK. With respect to the landscape, there's a few things I want to add. When we were—a number of people, of course, have mentioned the compression of the range there and it, indeed, adds a very unique quality to this, both in terms of recreational opportunities and also in terms of habitat diversity. We tried to get an estimate of how unusual this kind of alinement might be in the Arctic, both physiographically and biologically, and we did that through what—primarily published information and topographic maps, circumpolarly in the Arctic, and we found two other places, physiographically, that matched this, and only two. One of them was across from the Scandinavian countries, up through the Sweden, Finland area, along that range of hills. It does not have the biological component. We did find one other area in northern Siberia that does have at least a roughly comparable compaction of coastal and interior habitats, as well as the physiographic compression, and that's just about it. In and of itself, it's only unique if one is in the business of trying to protect these lands and, of course, the advantage is, you get a lot more for a lot less. It also adds the kind of drama that only exists in these areas, and especially on the north side.

There's two other areas, one that Wilbur mentioned, or two other things. The Katakarak Plateau, just north of the Sadlerochits, which is particularly significant within the existing range, and then further to the south and to the west, the Attigan Canyon is, I believe, variously included and not included in the proposals. It's quite an interesting area. Its prime values are wildlife and not just scenic, but I think it's quite worthwhile, and then the north fork of the Chandalar, not far southwestern, and probably deserves some note. I just flew over and I've never had a chance to be on the ground in that area, but it struck me as being really considerably different in its character from most of the other valleys in that southwestern region, including other valleys of the Chandalar. It's just interesting, it's homey, is the kind of impression I got from it. It's well treed in the lower end, its alpine end goes up into the high mountains and its very headwaters crosses the pipeline haul road. Wilbur has been on the ground there. He may or may not want to speak to that.

There are two points with respect to the archeological values. Abe mentioned the areas on the coast. We did just a flying reconnaissance to see what we could see along the coast and we were quite impressed, especially east of Barter Island and right in that immediate coastal area, certainly to the west as well. There's just a number of sites, most of which we didn't map, but requested the Arctic Slope Regional Corp. or at least we didn't publish it with the report, but they're all very interesting. A lot of sod huts, lots of old whaling stations along the coast. Some of them, the tops of the huts would be buried in a lot of wildflowers along the bases of the huts.

To the south, it was mentioned earlier that there's a number of caribou fences that were constructed by the Kuchin Indians, primarily outside of Arctic Village. I wanted to bring to your attention a report that was published by Arctic Gas in a biological report series, volume 32, that deals with their caribou fences. They spent a lot of money and found quite a large number of them and interestingly, it also demonstrates that the movement of that herd has been stable for a very long period of time, that is, that many of the fences, though not all of them, still—their alignment and location is still within the existing movements of the caribou, although they've been built decades to in some cases much longer, hundreds of years ago.

Mr. HARVEY. Anything else on the scenic and landscape values? Yes?

Mr. MILLS. I'd like to talk about a few other areas, mainly in the western parts or the proposed additions to the wildlife range. The first is the Canning River and the Marsh Forks. The Canning River is one of the at least four largest rivers on Alaska's North Slope. It is approximately 130 miles, and it is a complete drainage system from the mountains to the sea. It flows to or adjacent to really outstandingly scenic mountain country for about 80 miles of its 130 mile length, and it has its source in glaciers up in the Franklin

Mountains and then it traverses the mountain country, as well as the foothills on them and the coastal plains on out to the coast. The Marsh Forks, I think, is probably one of the most scenic parks of the drainage. It has some outstanding weathered limestone mountains with very colorful faces and eroded spires and broken rock and polished walls and grottoes and that is an area that's currently within that transportation corridor.

Another area of the Canning that is especially interesting and unique is the Cache Creek, Eagle Creek and Ignik area. This area has a large spring called Shublik Spring, which is—which has the highest flow rate of any of the year-round flowing springs in Arctic Alaska and it is a very impressive area. It has an unusual community of vascular plants and as you go past the mountains where it enters the canyon, it just forms a huge rooster tail that kind of almost seems like a waterfall coming right into the Canning River. Very, very impressive area, and below Shublik Springs is an extensive field of overflow ice, and I'll tell you, it's really impressive to move between these walls of 8 to 10 foot high overflow ice. It has its scenic values, as well as some very impressive recreational values, very unusual. And the other aspect of Cache Creek that's important is that it has one of the most extensive areas of balsam poplar or cottonwood, which grows along the banks of Cache Creek for about a mile and it's pretty extensive, and I believe it contains some of the largest, if not the largest, trees on the North Slope. There are some that go up to, I believe, about 30 feet and some with diameters of around 12 inches. And also the views, when you get down into this area, the Cache Creek area, looking to the west over the Arctic foothills, is very, very impressive, and you're looking back up these side valleys which run east/west and are also very impressive. Some very fine examples of eroded gorges are in there.

Mr. HARVEY. Any other comments? All right. Let's——

Mr. MILLS. Are we still on scenic? I'd like to talk some more.

Mr. HARVEY. I'm sorry, I thought you were through.

Mr. MILLS. Oh, I was through with that particular area, but I have some more. I'd like to say something about the Phillip Smith Mountains region. Now, the Phillip Smith Mountain region extends roughly from the pipeline corridor over to the existing boundary of the wildlife range and this is about 110 miles from east to west and varies in widths from 90 to 100 miles, and the north side of the Phillip Smith Mountains are drained by the Sagavanirktok River and its many large tributaries, including the Attigan, the Ribdon, the Blue Vine, the Ivishak and Accomplishment Creek. The south slope of the region is drained by the many forks of the Chandalar, the north, the middle, the east and near tributaries, the Wind River and the Jungjek. The North Slope mountain valleys here, I think, are one of the really unique features of the area. When you get east of the trans-Alaska pipeline corridor, the Brooks Range bends sharply to the north and consequently you get these river valleys which really penetrate deeply into the mountains, and you get a type of scenery here that is very unique to the Arctic. These valleys, of course, are treeless, all alpine, they have tremendous hiking and recreational potentials. There is virtually no brush. The valleys are fairly flat and easily negotiated by foot, and they offer a very, very excellent opportunity for recreation. The Phillip Smith

Mountains are composed largely of white limestone of the Lisburne formation, and this limestone forms some of the most impressive scenery in the Brooks Range.

It is present across large areas of the range, but in the Phillip Smith Mountains region, some of the most extensive areas are present. In fact, at the Ivishak, the Lisburne formation is over 60 miles wide and it extends all the way from the northern front of the mountain to over past—southward over the arctic divide. The arctic divide in this area, I might add, also is extremely rugged. Again, west of the pipeline corridor, the divide is fairly open and gentle and as you move eastward into the Phillip Smith Mountains, it becomes very rugged and quite glaciated, with permanent glaciers and many perennial snowfields.

Another area which is significant and I think warrants some special attention, is the area around Porcupine Lake. Porcupine Lake, which is at the head of the Marsh Fork of the Canning River, and the lake actually drains into the Ivishak River, but it offers access to both the canyon and the Ivishak, and the Porcupine Lake is situated in an area—it's within the midst, the heart of the mountains of the Brooks Range, but it is situated in an area of very gentle, undulating meadowlands, and this meadowland extends all the way past the headwaters of the Ivishak, across the Canning River and eastward for something like 30 miles, and it is an excellent area for wildlife habitat and Dall sheep and also there are large populations of small rodents and things which provide food for raptorial birds, and again this is a very gentle area for hiking and recreational potential. I think that's all I have on the scenic.

OK. And then moving over to the south slope of the Phillip Smith Mountains, it seems the area here that warrants the most attention is—and I'd like to address my comment to the north fork of the Chandalar River. The north fork has its headwaters against the divide in the Phillip Smith Mountains and it traverses an extremely diverse type of geography. Along the divide, the peaks are a very, very rugged steep relief, snowfields and glaciers, and then as you move downstream, you get to an area where three great Pleistocene glaciers merge to form the main north fork and this is an area of sort of gentle topography, rolling hills and then along the river, there are several nice outcrops of rock and some of them going up to 100 feet high. And then as you move further downstream, you enter a completely different geologic zone. Below Quartz Creek for about 30 or so miles, the north fork flows through an area of limestone rock, and here you get, again, these beautifully weathered limestone mountains. They're very colorful, ranging from red to brown and it is an excellent area for sheep and also for moose. There are numerous lakes in the valley bottom, which support a fairly good moose population. Particularly as you round the bend of the north fork and head southward, there are—there is an area around what they call Jero Creek and the two creeks that lie to the south of that, that are surrounded by a large grenetic pluton, and this pluton is over 44 miles in extent and these areas are very, very unique in the Brooks Range. There's just a handfull of them and this area is one of the larger ones, and the scenery in here is just superlative. The views from the north fork, looking up into Jero Creek, where you have the vertical walls almost coming down into the valley, it's very impressive. And this area now is included within the coalition's proposal and I believe it also has been indicated for selection by the State of Alaska and I feel that the scenic values here are very superb and are important to the integrity of the north fork valley and I think they warrant some protection under one of the—by addition to the Arctic Wildlife Range.

MR. CHILDERS. This gentleman has asked a little earlier, what kind of—how many people are using the ranges. One of the things I think very important to realize about the range is, unlike some of the other areas even further west than the Brooks Range, much of the area, especially in the existing range, cannot support the extent of recreational use as many of the other areas, primarily because the valleys tend to be very straight, very open. One can pick up the sense of crowding very easily. Something else is going on in the valleys within several miles and you know about it.

Mr. HARVEY. You're making a judgment about what kind of recreation you want, though.

Mr. CHILDERS. Well, it was—Well, we conducted a survey of all the recreation we could locate for 2 years, in 1975 and 1976.

Mr. HARVEY. You're saying the people that go there want a certain kind of recreation, otherwise they'd go to a campground on the Denali Highway? I assume.

Mr. CHILDERS. Right, yes, correct.

Mr. HARVEY. That's exaggerating, but——

Mr. CHILDERS. That's correct. In terms of the land forms, what I'm saying is that, assuming people—at least one—are going to that effort to get some separation from other people, it's—the existing range tends to be very open and straight and there is much less opportunity to hide, as it were, so the caring capacity for those people who are concerned about solitude, it's probably much less than some of the other——

Mr. HARVEY. On these, we're only concerned about the existing range with respect to why it should be designated as a wilderness.

Mr. CHILDERS. OK.

Mr. HARVEY. Of course, it's already been—I mean, it already is a game range. Or if you think it ought to be designated something else, a national park or whatever, but I—We're really focusing on, other than the wilderness thing, the proposed additions.

Mr. CHILDERS. Why don't you go ahead and I'll come back if there's not an opportunity later.

Mr. MILLS. I'd like to make just a brief comment about the wilderness proposals. The Fish and Wildlife Service, in their survey of the existing wildlife range, they found only 88,000 acres out of the nearly 9 million acres of the range that would be unsuitable for wilderness and this would include the proposed additions as well as the existing range. Almost the entire area is highly suitable for wilderness values and in my opinion, this offers probably, I think, the finest opportunity to protect a really truly large area, which would almost approach a complete ecosystem if we take in virtually all these land forms we talked about. It would take in entire habitats of barren ground, grizzly bear, wolves, the whole spectrum of northern plant and animal life, as well as protect a very, very substantial portion of the calving grounds, the major summer range and a good portion of the winter range of the Porcupine caribou herd, and I think this is really one of the finest opportunities we have to protect a truly large, fine wilderness area.

Mr. HARVEY. Any more comments on scenic and landscape. All right. Let's talk about wildlife values. Go ahead.

Wildlife and Fish Resources and Uses

Mr. MOWER. My name is Fran Mower, I'm with the U.S. Fish and Wildlife Service. I'd like to briefly outline the wildlife values associated with northeastern Alaska. I will sometimes be talking about values that are found in the wildlife range, in the existing wildlife range, and also those that are found outside. I will try to qualify that——

Mr. HARVEY. Please do, or we'll have to assume they're all inside the range.

Mr. MOWER. As many people here know——

Mr. HARVEY. We're just trying to get information to help our members decide whether the range should be enlarged or not. They're not proposing to dismantle it.

Mr. MOWER. All right. The northeastern Brooks Range of Alaska supports a wide variety of Arctic wildlife. This primarily is the—one of the main reasons why we have such a diversity and richness of wildlife in this area. It is consistent with what's been presented already in respect to the compression of the physiographic zones in this area. We have—as a result of this compression, we have a terrific variety of wildlife habitat within the area. Perhaps one of the most significant wildlife resources in the area, of course, is the Porcupine caribou herd, which is international in range. It reaches generally in Canada and also within the additions of the Arctic wildlife range. This herd presently numbers about 100,000 animals. One interesting fact to consider here is that when one considers the estimated population of caribou in the State of Alaska, as published in 1971, that total caribou population was 495,000 animals. The 1977 statewide caribou census shows 231,000 animals. At this point in time, the Porcupine caribou herd makes up almost 50 percent of the State's caribou. It also makes up essentially 50 percent of our Nation's caribou.

The herd calves on the north slope of the Arctic Wildlife Range in late May and early June, then gathers in very spectacular post-calving aggregation and generally moves eastward. Many groups of caribou scatter throughout the Arctic National Wildlife Range and to a certain degree, some of the land west of the Canning River at times. Toward fall, these animals move—Well, during the course of the summer, there is a generally eastward movement of the caribou back into Canada. Some of them goof around and come to the south side of the Arctic Wildlife Range in the late summer. There is caribou found many times in the south additions to the Arctic National Wildlife Range. Wintering takes place, in addition to a large area in Canada, in the upper Porcupine basin, in the Field River basin. It also takes place in various valleys on the south side of the northeastern Brooks Range, in such valleys as the north fork of the Chandalar, the middle fork of the Chandalar, the Wind River, Jungjek River, east fork of the Chandalar, the—sometimes in the Sheenjek and Colleen Rivers, they may be found in the winter. In 1973, as many as 30,000 caribou wintered in the south additions to the Arctic Wildlife Range, around Arctic Village and in the northeastern valleys from Arctic Village. Going on from caribou, we get into many other internationally significant species. One of those being polar bear. The Arctic National Wildlife Range is the only area in our Nation that has some degree of conservation or designation for conservation of polar bear. This animal has been——

Mr. HARVEY. Do they range up in the additions?

Mr. MOWER. No, sir.

Mr. HARVEY. OK.

Mr. MOWER. I was speaking in cases of polar bear, with relation to the desireability of wilderness designation for further protection of the species. In October, the female polar bears that are out on the ice patch often move onto the coastal plain of the Arctic National Wildlife Range and build their winter dens. They den there for—until about April, when they emerge with their young. Experience has shown that in polar bears that are kept in zoos, that in order to—for the female to successfully give birth to their young, they must be in a noise-free, disturbance-free area for the time of this denning. Noise can disturb the mothers, the female bears. If they leave the dens early, high mortality is expected.

Eight years of surveys have found the highest density of polar bear denning in Alaska occurs in the Arctic National Wildlife Range, along the coastal plain, and also out on the shore path sides, up to about 15 miles offshore.

Mr. HARVEY. Does that occur all along the coast? Is it generally distributed, or does it go on to more than one part of the coast? And if it is, which part?

Mr. MOWER. It's spread out. I mean, what I'm saying is, 50 percent of the dens found in the years surveyed occurred in adjacent to—in or adjacent to the Arctic National Wildlife Range coast lines. Again, this compression of physiographic features is what's responsible for the favorable cut bank areas. The wind that blows the snow into these drift areas is—makes denning habitat favorable there that usually is not found elsewhere in coastal Arctic Alaska.

This offshore area, I might add as an aside, is also the summer feeding area for endangered bullhead whales. Other offshore values along the Arctic National Wildlife Range include a coastal lagoon system, which supports the migration of over a million king eiders and a half a million oldsquaw that are bound for Canadian nesting grounds. These lagoons are also important for summer feeding areas for Arctic char. The coastal plains, foothills region host 200,000 to 300,000 snow geese each fall, that stop there to recharge, to gather food sources for their fall migration. Dall sheep are a very common wildlife species found in the northeastern Brooks Range. Out of the total of 18,000—or estimate of 18,000 Dall sheep found in the Brooks Range, about 8,200 would be found within the existing wildlife range and its proposed additions. The existing wildlife range has about 5,300 sheep. The proposed additions would have approximately 3,000. One of the reasons for the additions of the Arctic National Wildlife Range is that the present boundary splits the major sheep population areas, that being the Canning

River. The Marsh Fork of the Canning River, as Wilbur mentioned, some of these outstanding limestone formations are critical and are very important wintering areas for Dall sheep. These areas are windswept. Many of the Dall sheep of the Canning drainage, which supports approximately 1,200 Dall sheep, move out of the Arctic Wildlife Range, into the proposed addition. I might add that that particular area at this time is within the corridor withdrawal.

Other species found in the Arctic National Wildlife Range include the barren ground grizzly bear, wolves, wolverines. Muskox have been reintroduced in the area in 1969, approximately 49 muskox were released at Barter Island. These animals have increased and are now numbered a little over ninety animals. It is the most abundant introduction area for muskox in all of Alaska, so the animals are doing very well, reproducing.

Mr. Harvey. Was there a historical presence of muskox in the area?

Mr. Mower. Yes: there were. They were exturpated with the coming of the white man and the introduction of firearms. I might add that there are also recordings and records of muskox on the south side of the Arctic National Wildlife Range, and the U.S. Fish and Wildlife Service is considering plans for reintroduction in that region also. Many of these species I've mentioned are wildernes oriented species, the caribou probably being the most dramatic example of an animal that basically requires wilderness to thrive and continue without suffering population decline. I might add that when we get a little bit away from the general region we're talking about, the Prudhoe Bay Area bisects the range of what's commonly called the central Arctic caribou herd. There are many studies that the Department of Fish and Game has conducted on this herd, and biologists that are working on this are very concerned about the future, the long-term future of this caribou herd. The calves, they are finding now that the calves and—or the cows with calves are avoiding the oil belt area and the pipeline, itself. The future of that herd is undetermined at this time. We'll have to watch to see whether it declines or not, but these are some of the preliminary observations they're making and they are very concerned about it.

I have a couple of other comments to add on fish in the area. As some of the people mentioned in the scenic section, the various limestone formations associated with springs are—produce an unusual number of overwintering sites for Arctic char, Arctic grayling, in the northeastern Brooks Range. As you go west from the pipeline corridor, you basically run out of Arctic char habitat. The Arctic Wildlife Range in the Sagavanirktok River, the Canning River, Lupine, Red Don, Chuka, these are all rivers in the addition, the northern—the western additions to the Arctic Wildlife Range are very important overwintering areas for the Arctic char run that goes—comes up the Sagavanirktok River. These warm water streams are also an item of high scientific concern, in that they do support very interesting plant associations and also, in addition to the fish overwintering, some very unusual bird associations with them, and also mammals. For instances, birds such as the dippers are found around these streams all winter long, and it is also the only recorded area on the North Slope, as I understand, of land otters associated with these warm water springs.

As far as wildlife use, human use of the wildlife, that, of course, can be broken down into two categories. Basically, consumptive and nonconsumptive use. I'll talk about the consumptive use first. The Villagers of Kaktovik harvest, as a rule in any given year, a range from zero caribou up to about 200. They take probably a dozen Dall sheep in their subsistence activities. The last 2 years, they've managed to kill two bullhead whales each year. They also take considerable numbers of Arctic char, whitefish, along the coastal lagoons. They take some waterfowl during the season. These—All of these resources are extremely important to the people. They could not exist without them in that very harsh Arctic environment. Moving to Arctic Village, there, in certain years when the caribou wintered near the Village, as many as 1,000 caribou have been taken, although this ranges again from as small as zero, all the way up to possibly 1,000 caribou. There, they also take moose, when available, ptarmigan, snowshoe hare, a few Dall sheep. Harvest also occurs of the Porcupine herd in Canada at Old Crow Village, where up to as many as 500 caribou have been taken in a given summer or a given fall. Other Villages in Canada, such as Port McPherson, Arctic Red River and some of the people from Inuvik do harvest a few caribou from the Porcupine herd.

The sport hunter use is primarily oriented to Dall sheep. There's probably in the neighborhood of 40 to 80 Dall sheep taken in the existing wildlife range. The overall take has been recorded by the Department of Fish and Game, I believe, to be 110 to 160 Dall sheep for the entire Brooks Range.

Mr. HARVEY. For the entire Brooks Range?

Mr. MOWER. Right. Nonconsumptive uses, I think have been touched on in the scenery section that was already talked about. Many people come to the Arctic wildlife range to see the wildlife, view the wildlife. An extreme reason for their coming to the wildlife range, there's nowhere in this continent where we can observe masses of ungulate herds that resemble the situation of the herds of buffalo that were found on the plains back in the early days of our Nation. This is the only place where people could ever witness this epic of large ungulate migrations in the Nation today, the last place that we have where the land is protected for wildlife values.

Mr. HARVEY. Can you just briefly tell us when those—that caribou herd is in the refuge, which times of the year and where?

Mr. MOWER. Well, OK, generally there are caribou in the refuge almost all year long. Some caribou have been seen on the North Slope this winter, various scattered bands, but generally speaking, the caribou enter the Arctic wildlife range from the east side from Canada, probably in mid-June—excuse me, mid-May. There are caribou then in the existing refuge throughout the summer. They usually leave by September and move into areas to the south in Canada and also into the western extension, down into some of the valleys where they winter in Alaska.

Mr. MILLS. I'd just like to make one comment on Mr. Mower's report about those springs in the proposed addition, the Chuka Springs, particularly. The Andrus boundary just follows close to the mountain front and, I believe, excludes these springs and it's just a minor adjustment of the boundaries northward that would take in a little bit of the section of the foothills that would take in these springs and the large overflow icefields below them.

Mr. HARVEY. Yes?

Mr. FANKHAUSER. Bob Fankhauser of Alaska Miners. I would like to point out that I have worked in this northern portion of the Chandalar Quad and the southern portion of the Phillip Smith Mountains for a summer. I spent about 3 months there, and I did not see but maybe one caribou and the signs—there were some old horns, I mean, from years before and there were a few trails from years before, but I would submit that the caribou herd he's talking about there is largely restricted to the Arctic Wildlife Refuge and we may get into portions of that (d)(2) land. I cannot testify to that, but I have been on most of the (d)(1) block there in the Wind River and the Phillip Smith Mountains and the caribou in there are very minimal in the summer. And didn't he say that the wintering grounds, they move off into the southeast, into Canada and also towards the native village there to the east?

Mr. HARVEY. Arctic Village?

Mr. FANKHAUSER. Yes, Arctic Village. That's my only point, is that as far as I know and from the trails and so forth, the use to the west of that is very minimal, both summer and winter.

Mr. MOWER. My name is Fran Mower with the Fish and Wildlife Service. I'd like to respond to that, if I could.

Mr. HARVEY. Go ahead.

Mr. MOWER. As I said in my beginning testimony on the Porcupine caribou herd, generally speaking, the caribou winter—the larger concentrations of caribou winter outside of the wildlife range, to the southeast of Canada. That's correct. But there are years when significant numbers of caribou do winter on the south side of the Brooks Range within the proposed additions to the wildlife range. This is—has been documented.

Mr. HARVEY. On the west?

Mr. MOWER. Pardon me? Yes, on the west.

Mr. HARVEY. Yes, OK.

Mr. MOWER. Primarily on the west, and the Arctic Village area and those mountain—those river valleys to the northwest. As I stated previously, in 1973, as many as 30,000 caribou wintered in that area, and they don't always stay in one valley during the course of the winter. They move from one valley to another and the people of Arctic Village can certainly attest to caribou wintering in the south side of the Brooks Range, but that's when they get their caribou is during the wintertime. It's very important to them.

Mr. FANKHAUSER. I was speaking of the section of the western Phillip Smith Mountains and the northern Chandalar area, which would be a bit more to the west of where you talked about.

Mr. MOWER. Right. There are records of caribou wintering in these areas.

Mr. HARVEY. Yes?

Mr. CHILDERS. Yes, Mr. Chairman. There are several things with respect to wildlife, which has already been mentioned. I'd like to briefly go over a few things on the caribou. First of all, I think Mr. Mower is mistaken, it was not one-third, but two-thirds of the herd that wintered in the Chandalar drainages in the winter of 1971-72. The Renewable Resources found that comes to over 60,000 animals. That's not usually the case. In fact, usually it's 10,000 or less. That is the major wintering area in the north—in Alaska for the Porcupine herd.

It seems to be extremely variable, but the same general area is used every year and so far as I know, there's very little understanding of what causes these very wide fluctuations in the numbers, but that area is consistently used by differing numbers of caribou from—usually from two to in one case, over 60,000 animals. The—on the north end, there is one other thing that's gone on and I think was mentioned by Senator Gravel before the Senate in what month, I believe January 20, and that refers to the mapping of the calving—the prime calving grounds of the North Slope in the existing range. The—and there's two things I would like to mention. First of all, the calving grounds are highly variable and exist all the way across that range, depending on local conditions, that is, where the snow is, where the mosquitoes have started to come out by the time they arrive and so forth. The other point about that area I'd like to make is that it's not simply the calving grounds, but it's a critical habitat. Those caribou, especially calves and calves with cows, seem to be particularly sensitive to disturbance throughout calving, which begins the end of May, first part of June, and throughout the next month that they spend there feeding, that is, throughout June. Over that period, they tend to aggregate in very large groups, usually right on the coastal plain around Camden Bay. The heaviest concentrations vary from year to year. They are usually on the central and eastern part of Camden Bay, but occasionally they've all amassed on the western end of Camden Bay and occasionally crossed the—or at least some stragglers always occur across the Canning River. The best guess appears to be that they're there also to avoid insects, but it's not entirely clear. The point is that those animals are extremely sensitive during this whole period of their lives.

The cows have just gone through their winter migration. They tend to be in a depleted condition. They're very susceptible to deaths from stampeding. The calves as well tend to get lost or get injured during runs and they—in some tests in Canada, they were finding that if disturbed in this area, mortality could occur as a result of stampeding just a mile or two. These are animals that are used to traveling many thousands of miles a year. So there is a——

Mr. BEVINETTO. Is there a very low flight threshold?

Mr. CHILDERS. At this time of the year, just because they're depleted and because they're with their calves. That's not true all year long, and—but this area is used primarily just by the cows and pregnant cows and then the calves after calving. The second thing is that after this aggregation, they tend to move east—you were asking about the east of the range—and then come back into the range in a number of areas, usually up in—sometimes up in the first area or around to the south. I don't have the maps with me. The movements are somewhat complex. And then in the later fall, they'll—those who are wintering in Alaska will come in primarily on the south side. Like we mentioned earlier, there's a number of wintering areas, but the prime one is in the Chandalar drainage, up, oh, probably at least halfway up the north fork of the Chandalar and then to the north and further east. There's also a number of endangered species in the range, that occur in the range. The Arctic race of the peregrine falcon nests lightly in various parts of the range, along river cliffs and bluffs. There's three species, I understand, of endangered mustard, about which I know virtually nothing.

Then there—some of the fisheries biologists who were working in with Arctic Gas doing fishery surveys in the range have suggested that the Arctic char populations existing—these isolated populations existing in the warm springs in the northern areas probably constitute a separate species, and if so, they are probably also endangered or would qualify for classification as endangered. So far as—this report, I think, was in 1974. So far as we know, there's been not definitive work on that. Let me see. There's one area of the range that was mentioned a little earlier, the Kataktarak Plateau, the Shublik Mountains and that whole area at the western end of the existing range and the north side, that's particularly significant in that it represents the northern extension of a whole number of species. That is addressed in this report. I won't go into it in any great detail, except to mention that it includes, unlikely as it may be, a number of golden eagle nests north of Peters Lake, Dall sheep that have been 3 kilometers north of the 600-meter line, which is fairly close. Occasionally, moose have been—occurred as far north as the ocean front, itself, and then the river otter, which he mentioned in the Kandik. As far as the use of wildlife in that area, there's considerable sheep hunting. It's grown very rapidly in the last several years. There's also sheep hunting by the villagers of Kaktovik, primarily in the Hulahula River drainage. They indicated in 1975, they took, what was it, oh, greater than 40 sheep, primarily just out of the Hulahula. They do—the figures—that seems like a lot to me, but Mark Simms, a gentleman who lives up there, assured us that, in fact, they had brought in somewhat—something around 40 sheep in that area. They also sheep in the neighboring—hunt in the neighboring drainages. The Jago to one side and also the Shublik and around back there. There's two fishing sites that are quite important to those people on the Hulahula River, primarily at the entrance to the foothills and then there's a lot of activity along the coast, which you could expect.

Mr. HARVEY. Is that it?

Mr. CHILDERS. Yes.

Mr. HARVEY. Any more on the wildlife? Yes, go ahead.

Mr. MOWER. My name is Fran Mower, with the Fish and Wildlife Service. I'd like to add one other comment on the aspects of wintering caribou and that is that the traditional prime wintering range of the Porcupine caribou herd, located in—to the southeast in the Yukon Territory, is impacted now by the Dempster Highway and it's uncertain what developments may happen along that route in the future, and it may very well be some of these secondary wintering areas that we've been talking about in the south side of the Alaska Range—excuse me, the Brooks Range, may at some future time be heavily used as a result of displacement activity in Canada.

Mr. HARVEY. Any other comments on the wildlife? Yes?

Mr. BISHOP. Yes. I can't add a great deal to the very excellent summary that's been given. I would like to add a couple of points, though. As far as the use of sheep in the Brooks Range, in general, and by sports hunters, I think the number of sheep that are taken in the Brooks Range is a little higher. I suggest to Fran that he missed a part of it.

As far as the amount of use of Dall sheep by sports hunters—well, by hunters in general in that area, the reported harvest is considerably higher than Fran indicated. It's a little over 200 for the Brooks Range total. The use by people from the Kaktovik of sheep that Bob Childers mentioned is just, as far as we know, about right. We would guess that on an average, the annual take of sheep is about 30, and this is generally considered subsistence type use. In contrast to the recreational or sport hunting use, though, the sheep are usually taken in the wintertime, ordinarily with the aid of snowmachines and on occasion, with the aid of aircraft. Let's see, as far as the—I think Bob also covered the business about avoidance by caribou of the pipeline and associated structures. It is related principally to the period shortly after calving, when the cows are with the calves, and the degree to which they avoid it diminishes. Nevertheless, there is some avoidance by all segments of the caribou populations. It just happens to be greater among the cows with calves.

On the harvest of the Porcupine caribou herd, I think we feel that it is higher, that it approaches—well, ranges between 4,000 to 6,000 on the Porcupine herd in general, most of which is in Canada. Anywhere from 1,000 to 2,000 may be taken in Alaska. Often, it's less than that, simply because of the distribution of caribou.

Mr. BEVINETTO. Could either one of you gentlemen comment on the degree of land protection on the Canadian side and the protection of the herd in the—that is, the caribous herd on the Canadian side?

Mr. BISHOP. I'm not familiar with the land status on that side, but I'm pretty sure we've got a report on it.

Mr. REFFALT. Bill Reffalt, Fish and Wildlife Service. There's been quite a few events taking place on the Canadian side just recently. They are far from completed, but I think about—within the last month, the Canadian Parks, Parks Canada, announced the proposal for planning for and public hearings on a wilderness park immediately adjacent to the Arctic Range on the Canadian side, extending the same latitude and part of the first river park—wilderness park. At the same time, I know that there is a task force appointed in Canada to discuss and develop a proposal for complete management and protection for the Porcupine caribou herd and this might entail several different classifications and, as yet, the task force report has not been released, but should be out within the next 2 weeks. So that should be available to you at that time.

Mr. HARVEY. Yes, Dave?

Mr. CLINE. Dave Cline. I just wanted to reemphasize that point, that American and Canadian conservationists for years have worked toward the establishment of an international wildlife range and it looks like, from what we're hearing in Canada, that the Canadians are about ready to make a commitment of protection to the land, over and above what they've been able to do to date, and I think we're likely to see this Porcupine caribou herd possibly declared a treaty resource and this will put a further burden, I feel, on the United States to continue to protect its—particularly its calving ground on the Artic Slope.

Only one other additional point on wildlife that I wanted to make is, we haven't yet mentioned the substantial numbers, several hundred thousands of snow geese that migrate along the front of the Brooks Range on the Artic Slope annually and particularly the important feeding area for these geese, many of which are from Wrangell Island in the U.S.S.R. They feed there on berries primarily in the fall, but it's a critical staging area before continuing on their long migration to the southern wintering grounds.

Mr. HARVEY. Any other comments on the wildlife values in the area? Yes.

Mr. CHILDERS. Just two quick things. The first is that the future of that herd is going to be the subject of two—one miniconference and then part of a larger conference this coming week in Edmonton and, hopefully, some more details will come out of that. The second is that, since I didn't mention it, the Attigan Canyon, just east of Galbraith Lake, is a particularly significant landing area for Dall sheep. It's in some of the proposals, not in all of them, and it probably deserves some kind of attention if it's continued that way. You know, it's right next to the pipeline corridor. They were to put the pipeline through there. It was just too tough and too expensive and it went around. We didn't win it on virtue, as it were. But they did not go through there and that area remains in its essentially pristine condition.

Mr. HARVEY. OK.

Mr. CHILDERS. May I make one other observation, and that is that already in the existing range, we're coming into a situation where these herds are—the caribou herds are running into conflicts with some other uses, and——

Mr. HARVEY. Such as?

Mr. CHILDERS. Well, in one particular area, when the caribou aggregate up and move across the range, they come through a very small valley in the lower Kongakut River. This was fairly well kept secret until a couple of years ago, no one was ever there. We are there in the summer of 1976 and although we were dealing with yearling and bull groups, we were very impressed with the skiddishness of some of those smaller groups in that area. At a quarter mile, when the wind shifted, they were showing marked reactions to it and we were keeping a fairly low profile. The number of people going in there has been rising really dramatically the last 2 or 3 years, and they generally come through in the early part of July and I think we have a real potential problem with managing recreationists in that particular area prior to the migration out through Canada. It's the only place where they all go through one small spot all at once.

Mr. HARVEY. OK. Thank you. In the interests of time, we've spoken to some of the people, but we're going to ask people, if they have any comments on the renewable resources area and on the State and Native selections issue, to submit them for the record unless there's—Do you have anybody here, Dave, that wants to talk about those? They're relatively, I think, minor, at least in acreage.

UNIDENTIFIED VOICE. Yes. The impacts would be minor. Some of the fellows who were here from Artic Village covered it.

Mr. HARVEY. All right. Let's get right into the energy values in the area, then.

Renewable Resources

Mr. MCINTOSH. My name is Ron McIntosh, of the Alaska Oil & Gas Association. The geology of the entire northern portion of the Arctic is an interconnected regional complex which spans both political and geographic borders. This is the Beaufort Sea coastline, across the Chukchi Sea and down into the Kotzebue Sound area. On this map, the ricks which crop out in the area are colored in with basically the greens and lighter greens and yellows, representing Cretaceous and younger sections. The browns and darker greens are Cretaceous/Jurassic and some Mississippian and then the purple, the Mississippian and Devonian, basically a carbonate section that you've heard quite a bit of people—quite a few people talk about before. This vast region here, which has got about 70 million acres in it, is from this red line that you can see here to the north. It's part of a much bigger region, which certainly extends as far as the MacKenzie Delta and to date, oil and gas have been found in different reservoir horizons, spanning geologic time from the Devonian through the teritiary, indicative of an extremely prolific hydrocarbon basin.

In northern Alaska, oil and gas have been found in 11 different horizons, in rocks ranging from the Carboniferous through the tertiary ages. We haven't found anything in the Devonian yet, but we're hopeful. I would like to make just a couple of comments on topography here, because it has application in this immediate area and its additions, the Arctic wildlife range and its proposed additions, as rest of the area, which will be commented to later. Basically, there are several topographic divisions which are important to us because of several reasons. First, the character of the topography tells us to a certain extent what's underneath the surface and that's important to us. Land forms may indicate potential oil and gas traps and third, the costs associated with exploration and development are certainly reflected in part by the topography that we're in. I trust that's not an echo.

OK. The Arctic coastal plain, which is basically this lighter green and yellow, extends all the way across. It's about 35 million acres. It's a generally smooth tundra-covered, featureless surface, rising into the foothills and ultimately into the Brooks Range. It's covered with thousands of lakes and both braided and meandering streams. Underneath it is a thick section of these tertiary through Devonian and older age rocks, which are prospective. So that tells us something about the geology there. The foothills belt, which as we move between this line and in through here and into the Arctic wildlife range, is a series of thrusts and anticlinal features which form structures prospective for oil and gas accumulation. The section potential in there is very similar to what it is out in the coastal plains. When we're talking about petroleum potential of the existing wildlife range and its additions, there are several significant things we need to remember, and let me just move over to this map, which is exactly the same map, but without the—all the background geology colored in.

Within the coastal plains, we have surface anticlinal features expressed of perhaps major significance. On the coastal area, we have oil seeps. On one of these anticlinial structures, called the Marsh Creek anticline, there is an exposure of oil-saturated sand. Offsetting the wildlife range and located on Flaxman Island is a recent discovery of unknown size, except that it did produce an excess of 2,000 barrels of oil a day. Immediately adjacent to it, in the Point Thompson area some several miles away, is another new discovery which was reported to have produced at a rate in excess of 2,000 barrels per day. This is in contrast to wells in the lower 48, where flush production these days may be a hundred barrels a day. We're talking about, things are big on the North Slope and the oil wells are, too. The Arctic slope portion of the wildlife—or the coastal portion of the wildlife range is about one and a half million acres. There's about 45 million acres in this overall coastal plain. That's about 5 percent of the total, and there's been quite a bit of discussion about percentages and I'd like to comment on a couple of those.

If we take away this little green blob that we see on this map, that's about three-tenths of 1 percent of the acreage in this overall geologic basin. That three-tenths of 1 percent contains 9.6 billion barrels of oil and 26 trillion cubic feet of gas. That's a very, very small percentage, and it contains a very, very high value. Each of us can multiply those barrels of oil by $10 or $11 or $12 or $15, whatever we think is appropriate, and each cubic foot of gas by some appropriate number to get at an end value, at market. One other thing in this area, and you can see there's coastal plain, there's an uplift.

Oh, I also would like to point out, in this immediate area here and here are the Hemic and Cavic gas fields, other known accumulations offsetting the wildlife range and its proposed addition in the foothills belt. So the offsetting wells have been encouraging. The surface geology that we see is encouraging. I must stress that it is surface geology. There is no seismic data on shore. Our data comes from evaluating the rocks and the outcrops.

Mr. HARVEY. Surface data onshore within the area of the Arctic——

Mr. MCINTOSH. Surface data onshore, yes.

Mr. HARVEY. OK.

Mr. McIntosh. Within the range and also, of course, you know, the data that we can gather outside of the range. That is our sole source of information at this point. It's very, very valuable information. We can see the rocks and their lateral extent and project into the subsurface. You have to remember that when you drill a hole, you're looking at about a square foot of rock, circle, and there's what, forty thousand—in excess of forty thousand square feet of rock in an acre or so? It's a small sampling from a well. This is a big sampling, and it's certainly—the A.O.G.A. would contend that the Arctic wildlife range should be firmly placed in a multiple use category, that evaluation is permitted. It is prospective, it is highly prospective, can contribute significantly to this Nation's energy supply, and certainly the prospectiveness of much of the Arctic Wildlife/Chandalar lands addition is also high. Oil and gas has a peculiar habit. It's not where we'd like it to be, it's where it happens. And we have to have the opportunity, if we are to find it, to look for it.

So to repeat some summary at the end, prospectiveness is high, as shown by surface geology, the results of offsetting wells and gas fields. The access, this high potential cannot be turned into any reality without access and without the ability to explore. In addition, a part of the exploration is ultimately—and we have used it for an evaluation, too, as has the Government and so on—is access to these highland areas around the basin and, of course, to be effective these days, the long-term geologists must have use of helicopters to do this type of work today.

Mr. Harvey. Are most of the most highly prospective areas—is that—that's in the area that's already within the Arctic Game Range?

Mr. McIntosh. In this immediate area, and let me just confine my remarks to this now at this point within this area, you would have to say that the most highly prospective portion of it is from the purple rocks towards the north. Now, that's from the oil and gas potential. Again, based on very, very limited knowledge, we have such minimal knowledge that it's a mistake to say there is no prospectiveness on the rest of it. That's certainly not the case. Similar situations in other parts of the country have turned out to be pretty prolific after people have busted their pick on them a couple of times. Thank you.

Mr. Harvey. Thank you. Are there any comments on this energy resource values?

Mr. Barker. I'm Jim Barker, Bureau of Mines. The North Slope province is considered to be favorable for sedimentary uranium. Again, our investigations are primarily confined to the Morton proposal, so I'm not really prepared to address in detail the energy resources that lie immediately to the northwest. However, in this area to the northwest of the Morton proposal is the easternmost fringe of the North Slope Cretaceous coalfield and that should be recognized. Also the Triassic formation has been known to contain trace amounts of uranium, which may be recovered with phosphate deposits there.

Mr. Harvey. OK. Yes, the gentleman to the left.

Mr. HOFFMAN. OK. Barry Hoffman, Alaska Miner's Association. I'd just also like to mention that we do have evidence that some uranium anomalies—and that's all they are, from the Devonian conglomerates that occur in the Phillip Smith Mountains Quadrangle, and like I say, they're stream sediment anomalies and they're unsubstantiated as to their importance, but they are quite high in uranium values and it is something that will be followed up and this is something that is a potential and those rocks shouldn't be underestimated.

Mr. HARVEY. Any other comments on the energy resource values? Yes, sir?

Mr. MULL. Yes, my name is Gil Mull, officially, for the record, it's Charles G. I'm a geologist with the Geological Survey here in Anchorage, primarily involved in the assessment of the hydrocarbon resources of northern Alaska as a whole and specifically at times with the wildlife range. In 1976, we were asked to carry out an additional assessment of the potential in the range itself, and that resulted in an administrative report which was submitted at that time. We've tried out some additional analytical studies since that time. I have some of that summarized on the map here, that I'll stick up on the wall in a moment.

Mr. HARVEY. Excuse me. Gil, did it include any drilling?

Mr. MULL. No, none at all. I'll, in fact, get more into the types of data that went into this in a moment. Considering the nature of this assessment, I think perhaps I ought to give a little bit of background on some of the studies that have gone into the study of the range, a little bit of the history. As most of you are probably aware, the Geological Survey has been involved in studying northern Alaska since roughly the turn of the century and has been involved in the area of what is now the Arctic national wildlife range. Lappingwell published their pioneering explorations in 1919. A rather intensive geological, surface geological investigation began in the area of the range in the late 1940's and they continued on to the present. I have been involved at various times in surface geology of the wildlife range since 1963. As I say, this present study was requested in 1976 and it resulted in an administrative report, a season of field work and some analytical studies that have continued on to the present.

As other people have commented, of course, you realize there has been no seismic work done in the area of the wildlife range. There has been some work immediately adjacent to the west and offshore to the north. The assessment that we made was based entirely upon surface geologic relationships, upon data that was derived from gravity surveys, data from an aeromagnetic survey and from some of our analytical work. Some background on this, in early 1976, Dave Barnes of the USGS compiled a regional geologic—excuse me, a regional gravity map of northern Alaska and revealed the presence of gravity high onshore in the area south and east of the Village of Kaktovik on Barter Island. That high had significance in that in some cases, highs of this type indicate that various basement highs or arches may be present in this area. Additional evidence of the possibility of a buried arch, a high, was provided by a proprietary aeromagnetic survey flown by Aero Services, which also suggests a regional buried arch or buried high in this general south and east of Barter Island. Still additional data suggesting a high in this area is provided by surface geology, exposed out here in the coastal plain area, far north of the mountain front are areas—are rock exposures that are substantially older than we would otherwise have expected to be present out there.

In addition, there are drainage anomalies along the course of the Niguanak River, which suggests that there is some sort of structural feature in this area. Oil seeps have been mentioned before. There's an oil seep at Manning Point, just across from the Village of Kaktovik, a tar seep down at Angoon Point on the coast down here, an oil saturated sand or shale exposure here on the Jago River in this area. The gist of this leads to an assessment of this particular area and I'll get into some more backgound on this in a moment, suggesting that this is an extremely high potential area. I think we have a pretty fair confidence that there may be, indeed, a fairly substantial onshore basement arch in this area. The general assessment that I would give to it is that it has extremely high potential, with the possibility of multi-billion barrel accumulations, of a type perhaps similar to the Prudhoe Bay area. Now, this is sort of at variance with some of the previous assessments that have been made of the area. Most of the studies that have previously addressed this area have concentrated on the Marsh Creek anticline in this area, a very prominent feature, a very prominent surface feature, certainly very highly prospective, but relative to this area south and east of Barter Island, I'd have to say it's only moderately prospective. The potential for substantial accumulations is quite good, but perhaps smaller than the potential of this area.

Following the discovery, the recognition of this gravity high by Barnes, Kasofsky and others of the survey in 1976, did additional fill-in gravity work and generated a more detailed gravity map of this general area and combining that gravity map with the aeromagnetic map, generated a very gross generalized depth of basement map. Now, this depth of basement map suggests that in this area south and east of Barter Island, that's the basements—and by basement, I mean a crystalline or metamorphic rocks below which we could effectively expect to have no significant hydrocarbon potential, suggests that the depth of basement in this area may be on the order of only six thousand feet or so. That map—and as I say, it's confirmed both by the gravity and the aeromagnetics suggests that this area north of the Sadlerochit Mountains, containing the Marsh Creek anticline, the area of Camden Bay, which may be a sedimentary basin on the order of 25,000 feet thick, a very, very deep sedimentary basin.

Area No. 3 here, colored in this blue, generally on the general assessment I would rate as slightly prospective. The possibility of accumulations would exist, but probably substantially smaller, in fact, perhaps very small. Our assessment would suggest that Area No. 4, south of the heavy dark line, while you cannot totally preclude the possibility of accumulation south of this point, its relative ranking is substantially less than the relative prospectiveness of these other areas. In general, most of us in the geological world agree that these areas, particularly south of the mountain patch, which is marked by this heavy dashed brown line, would be very unlikely to have much potential. It's possible, but not too likely.

Going back to the assessment of this general area south and east of Barter Island, now, this is substantially at variance, I think, with anything. In fact, it's probably something of a surprise to many people. It does suggest a buried arch, a regional high area. Such areas are extremely favorable for hydrocarbon accumulations and, in fact, the Prudhoe Bay field, located to the west of this here, is located on an arch somewhat similar to this. There are some other analogies that can be drawn to the Prudhoe Bay area. This is based on analytical studies that have been carried on. These are incomplete at the moment, but continuing.

I'm sorry that these things are so small. Probably most of you in the back probably cannot see these really closely. These charts show the gross stratigraphic and structural and geochemical relationships associated with this area. Here in the area of the—I might mention, this is a diagram that we generated that effectively presents the gross structural relationships in the area of the wildlife range. This one here is modified slightly from the published paper by Morgridge and Smith in 1972 on the Prudhoe Bay field. In general, the similarities are rather striking. Both areas have an area in which the—there is a lower sequence of stratigraphic rock units that have been uplifted, truncated, and eroded, overlain by a younger sequence of rocks, here colored in green, shades of green and yellow. Younger rocks, which have—as I say, are truncated and eroded the uplifted edges of these older rock sequences. That's a characteristic in both areas. The big bull's eyes here are intended to rather graphically display the organic richness of these rocks, essentially the organic or the hydrocarbon source potential of the fine-grained rocks, the shales contained within these stratigraphic sections.

A marked characteristic of both areas is that the young sediments in green, the Cretaceous Age sediments, are much, much richer in total organic content, have much greater hydrocarbon source potential than do the rocks in the underlying section. But it's—on a regional basis, our regional geology throughout northern Alaska has suggested that the—really the best looking source for reservoir potential, the best looking rocks that have a porosity and permeability, sufficient holes contained within their body to contain large volumes of hydrocarbons is in this younger section. The relationship, effectively, that build Prudhoe Bay was the unique juxtaposition of these extremely rich, organic-rich sediments in unconformable juxtaposition over the truncated edges of these rocks with good hydrocarbon source potential, and this is where the Prudhoe Bay hydrocarbon accumulation occurred. As I say, the same general relationship appears to exist onshore in this area of the Arctic Wildlife Range. It apparently could exist onshore in this area, in which there is a buried regional arch. The general concensus or the general conclusions that we have to draw from these relationships is that this area of the—at least the northern portion of the coastal plain area of the wildlife range is perhaps the most highly prospective area for hydrocarbons anywhere in Alaska, and in that I include the area of the national petroleum reserve. There are small local areas within the confines of the petroleum reserve in which this same relationship may occur, but by and large, most of that potential is probably offshore.

Mr. HARVEY. Mr. Mull, when you indicated your ranking here, were you including the offshore areas, not only those within the time lands, but the Outer Continental Shelf? You meant onshore?

Mr. MULL. Now, when I say—my ranking, when I say it's probably the most prospective area in Alaska?

Mr. HARVEY. Right.

Mr. MULL. In making that statement, I'm including it with the—just simply the onshore areas, although to tell you the honest truth, I would say that this is probably comparable to some of the potential in the Beaufort Sea offshore. It has a tremendously high potential. I think that's about all of the regional discussion I could give. I'd be happy to try to answer any other questions that anyone wanted to throw at me.

Mr. HARVEY. Well, I had one. I assume that you have not made a similar evaluation on the areas that are proposed for addition to the refuge?

Mr. MULL. Effectively——

Mr. HARVEY. Those areas that lie away from the coast, as you know.

Mr. MULL. Yes. Effectively, as Ron McIntosh points out, you cannot preclude the possibility of potential down there, however, on a relative basis, I would have to say it's much lower. I have not considered it as having any impact on the additions.

Mr. HARVEY. All right. Is there any further comment on the energy resources?

Mr. MCINTOSH. Mr. Chairman?

Mr. HARVEY. Yes?

Mr. MCINTOSH. Ron McIntosh, AOGA. I'd like to make a couple of further comments. What Mr. Mull has demonstrated here is rather intriguing and I think it's worth noting at this point that another Prudhoe sized accumulation in this area would add another one-third of the U.S. crude oil reserves. Prudhoe has one-third of the U.S. total crude oil reserves in it today, so if there were another one of these, that would mean that half of the total crude oil reserves the U.S. would be in Alaska in two oilfields. That's really a significant potential.

The other comment that I would like to make pertains to exploration in this general area and the rivers, the wild and scenic river systems. The rivers in this area tend to be braided streams with unstable channels, that are carrying a high siltation and sediment load and are building deltas out into the Beaufort Sea. However, they do have a good deal of value, including in the exploration the areas, first, they are a source of fresh water. And seasonally, fresh water is at times hard to come by on the Slope. Second, they are a minimal disturbance source of gravel. Now, the whole slope is underlain by gravel. If you dig 50 feet for it, you'll find it. But it's certainly less expensive and less disruptive overall if you can remove it from the river system. In this particular area, certainly the wild river classification would create some rather significant resources, from the exploration point of view

Mr. HARVEY. Any further comments on energy? Yes.

Mr. KLINE. Yes. Bob Kline, with the Department of Natural Resources. I was just going to say that the State assessment would agree fully with Mr. Mull and that it would also indicate that this area in the coastal area of the range is probably the highest prospective area onshore in the State of Alaska that hasn't already been developed. As far as the additions go, in the assessment, we've only identified about 31,000 acres that have potential in those additions for oil and gas and they rank from about the second down to the seventh percentile, so it's a much lower potential.

Mr. HARVEY. Thank you. Is there something you wanted to add?

Mr. MULL. Yes, I should make one other comment and that's relative to the degree of precision on the data that we've been using. Remember that this is gravity data, aeromagnetic data. Don't by any means, take those lines as they are drawn precisely on that map as gospel. They can—with additional exploration, those lines could shift substantially. I, frankly, don't think that the relative ranking of the area will change, but the areas included there are, by no means, gospel.

Mr. HARVEY. Anything else on energy? All right. Hard rock minerals. Who would like to talk about that? Yes?

State and Native Land Selections

Mr. GRYBECK. I'm Donald Grybeck, with the U.S. Geological Survey, and they're just about to uncover my map over there. This map hasn't been put in the record and will be put in the record. It's part of our level two study for all of Alaska. This is the portion in the Brooks Range. It happens to be nicely colored there and I think most of you can see the colors in there. In the Arctic national wildlife range and the extensions, first of all, I'd say the area is very poorly known. We have done relatively little work. Industry has done almost none. There's some blue patches up there. They do go into the extension. They're an area of bright mineralization. They're primarily known from some recent geochemical work we've done in there. There's a brown area that covers—goes through much of the present Arctic national wildlife range, there are scattered occurrences of copper, primarily, some other minerals in the lower paleozoic and pre-Cambrian rocks. Some of that does extend over into the addition. Something that's been touched upon before, there's a red area, that's the granites in the middles of the Romanzoff Mountains. They have a great variety of minerals occurrences known in the peripheral zones of these granites, lead, zinc, molybdenum, tin, tungsten, uranium, a whole list of these things. The granite is uraniferous. That mineralization obviously does not extend out in the extensions. It would provide a very convenient source for a uranium deposit in that orange area in the coastal plain up there. Only on geologic grounds, you might consider that a prospective sedimentary uranium area. There's quite a band of dark gray rocks there. Perhaps one of you can point to them. They're not quite as noticeable. Those are the phosphates that extend all the way along the north branch of the range, the—in the area in the extension——

Mr. HARVEY. Those don't appear to come into the extension area, or do they?

Mr. GRYBECK. Yes, they do. They're small bits and pieces and you can't quite see them.

Mr. HARVEY. Oh, all right.

Mr. GRYBECK. They're in the Permian Achuka formations. There's been a number given for the phosphate resources of all of northern Alaska, which is based on very preliminary data. It's something like a billion tons of phosphate bearing rocks. How much of that is in the addition to the Arctic national wildlife range, I don't think anyone could say at this time. there's quite an area of phosphates up there. One other type of deposit that does bear on the addition to the range is the area down in the southeast corner. This is the Christian ultramathic/mathic complex that's been remarked, that happens to lie just about off the boundary of a number of areas we've talked about. It does have potential for chromium, nickel, copper, platinum group elements, possibly, although there is very little data on that area. There is a dark green area, which is within the Arctic national wildlife range, that the U.S. Geological Survey and the Bureau of Mines has done some work in there. It does seem to have quite a concentration of mineralization, primarily lead, zinc, but there are occurrences of molybdenum, tungsten, tin, and little work has been done on it, and then the light green area, the southeast corner, there are scattered occurrences of copper, silver and gold and barite, but very little has been done on that area. That's all I have.

Mr. BARKER. I'm Jim Barker of the Bureau of Mines. We conducted intermittent field work in the proposed additions to the Arctic wildlife range for the past two summers. We have a report in process of being published that should be available in about a month. The addition basically consists of sedimentary rocks, which form most of the Brooks Range throughout its 600 mile length. There are three highly favorable provinces identified within these additions.

The first favorable province is in the area between the Marsh fork and the Ivishak River. These appear to be extensions of the Mississippian rocks on the western Brooks Range that contain significant amounts of lead, zinc and barite. Recent discoveries on Wulik River, near Point Hope, in the Drenchwater Creek area of the former naval petroleum reserve and at the Red Dog prospect in the Delong Mountains are all in similar geologic settings. The zone, itself, is very poorly defined. The evidence that we have to date indicates that the area north of Porcupine Lake and between these two tributaries may be a portion of that mineralized zone. Evidence includes some geophysical data and a regional survey that we conducted this past summer. A number of anomalous elemental patterns are found in the area, such as tin, barite and base metals. They indicate the area to be favorable.

Also within this region, we found several significant occurrences of fluorite. One of these definitely should be followed up on. Within that region also phosphate bearing rocks occur near Porcupine Lake. These have not been tested or evaluated.

The second major area of mineral potential identified is in the Devonian carbonates and shales between the middle fork of the Chandalar and the Wind River drainages. These are in the southwestern portion of the addition. There has been some industry exploration in this region over the last 5 or 6 years, and this has resulted in a number of discoveries. Generally speaking, the area is very favorable for carbonate and shale hosted lead, zinc, and copper deposits. Our work this past summer has indicated that this region may be extended further to the east into the headwaters of the Smoke Creek towards the middle fork of the Chandalar.

The third major region of interest, I think, would be the granitic terrain in the metamorphic complex around Bear Mountain. Bear Mountain is slightly within the wildlife refuge, but the geophysical data available indicates that the basement rocks extend to the south into the proposed extensions. We examined the mineral occurrences there this past summer. Our report, again, is in preparation. We found that the base metals, copper, lead and zinc, occur in high-grade sulfide veins with strike lengths up to 2,000 feet identified. Also the zinc and lead occur in disseminated veinlets over a rather extensive area near Galena Creek. Most important, though, was our work around the rhyolite breccia a few miles to the west of Bear Mountain. This is a body about 1,000 feet in diameter that contains highly anomalous amounts of tungsten, molybdenum, and lead. This definitely warrants further consideration. The more recent proposals, extend the boundaries to the south and take in the northern portion of the Old Crow pluton. My remarks earlier would also apply to this area.

Those are the three major areas. We have identified an area in the upper Thomas River where red bed type copper deposits may possibly occur. The area is anomalous in copper. We have identified copper mineralization in several localities.

The phosphates on the Shublik, I should have mentioned previously. Not only is phosphate known to occur in this formation, but the samples taken in other areas of Alaska indicate that these phosphate deposits may be highly anomalous in base metals, molybdenum and uranium. If phosphate is developed here, it is likely that trace metals could be recovered. The only other region I might mention was covered by Mr. Grybeck, the matic rocks to the south.

Mr. HARVEY. OK. Any other comments? Go ahead.

Mr. HOFFMAN. Yes. Barry Hoffman. I'd just like to point out a few additional areas. An area west of the Venetie Reservation, including both (d)(1) and State lands. There are active claims in this area for copper, lead, zinc and there was drilling in the past year and this will continue to be active. Also this area has been mentioned, the lead/zinc occurrences that have been found in the Devonian rocks and there are recent claims on several of these occurrences. This is fairly massive sphaelerite and galena and there will continue to be activity in the area. Also this—several of these lower paleozoic and upper paleozoic units, both in the Chandalar and the Phillip Smith Mountains quadrangle, are geochemically anomalous and there, as has already been mentioned, has been very little activity in the area and they haven't been truly evaluated for their potential. Also I'd just like to mention the northern portion of the Phillip Smith Mountains quadrangle also is quite geochemically anomalous. There's already been mention of some borite occurrences. We also know about the—some fluorite that's been found in the carbonate rocks up there, which is a slightly different type of occurrence. The—it may have some potential as a future resource. Also it should be mentioned that there are several barite anomalies near the pipeline corridor and this might be a future resource of drilling mud for the North Slope, to cut costs in that way for some local use. That's all I have.

Mr. HARVEY. Thank you. Yes?

Mr. WICKES. Mr. Chairman, Jim Wickes, Department of Natural Resources. Our statewide assessment indicates that 86 percent of the additions have some potential for hard minerals. This, I think, reflects the fairly mountainous character of the area. Of that 9.5 million acres of land with some hard mineral potential, some 2.2 million acres rank in the top fifth of the statewide assessment, and generally these are located in the southwestern part of the addition where, incidentally, the State has identified some selection interest areas.

Mr. HARVEY. OK. Any other comments? Yes, Bob?

Mr. FANKHAUSER. Bob Fankhauser, Alaska Miner's. I'd like to underscore the potential of the additional areas here for hard rock minerals, both by the fact that we're still here this late and also by the fact that I've spent a couple of summers in the Phillip Smith Mountains in the northern Chandalar area for a company, and also I know that several other companies have spent considerable monies in there and I think that the fact that these geochems that those private companies have followed up and found occurrences on the grounds and also the—from the geochemistry that is public information, reflects the tremendous—reflects the tremendous potential that this area has, based on its geology and on its projections of the same formations from further west, where known discoveries of massive sulfides, mainly of copper, lead, zinc, with high precious base metals also occur.

I know of one instance here where, in the Phillip Smith Mountains, there are massive sulfides of 30 to 40 percent zinc and associated lead, and these are two outcrops that are below the creek and separated by more than a mile in length. It's hard to estimate the potential and I have not. What I'm trying to say is, these claims belong to another company, so I can't really go into any details, but I would like to point out the significance of that sort of grade of massive sulfides in the same trend belt of rock that stretches across the Brooks Range. I might also add that of this major belt that extends across the Brooks Range that are favorable for this type of deposit, this is one of the few areas that is (d)(1) land that is open to prospecting. It is also one of the few areas that could be accessible via the pipeline corridor to getting minerals out. I wish the Commission to take these points in regard in as far as their new additions westwardly in the wildlife range. Thank you.

Mr. Harvey. Thank you. Any more comments? Yes?

Mr. Mull. This is Gil Mull again. This is a regression to an earlier subject. Just for the record, I wanted to comment that the combination of our earlier 1976 administrative report, plus some of the later analytical data will be published sometime this spring or summer as a Geological Survey open file report. I do have a copy of the report as it is now, to submit for the record.

Mr. Harvey. Thank you. Yes, sir?

Mr. Kline. I have one last comment on the State selection areas. We do have a State selection area which is in the Arctic wildlife range, which amazingly enough coincides with Gil Mull's map up there pretty closely, but I wanted to make two points on that. One of them is——

Mr. Harvey. The State selection areas, you mean——

Mr. Kline. That is area of interest No. 71.

Mr. Harvey. OK. I wanted to clarify that. Yes.

Mr. Kline. I wanted to make two points. The first point is that we would only be asking for the subsurface estate there and the surface estate would remain in the manager's proposal, and second, the reason why we made the interest area up there is that there are large amounts of State lands which are overlapped by the various proposals and the Secretary of the Interior has indicated that those rights won't be usurped, but he has said that some of them may have to be traded away.

Mr. Harvey. If that was done, would the State be willing to let the Federal Government have 90 percent of the revenue?

Are there any comments on transportation and access that are peculiar to this particular area? We've raised the issue, I've got two announcements to make. One, on Monday, we'll take up Gates of the Arctic, the Noatak and Kobuk Valleys, probably get into Cape Kruzenstern on the Seward Peninsula and then if—on Tuesday, take up the Selawik, Koyukuk, and Kanuti areas.

ALASKA NATIONAL INTEREST LANDS WORKSHOPS

MONDAY, FEBRUARY 20, 1978

Anchorage, Alaska

THE NORTHWESTERN REGION

Mr. Quarles. Today begins the next to last day of the Senate Energy and Natural Resource Committee Workshop on Alaska (d)(2) lands legislation. Today and tomorrow, we do the last region which is the northwestern region. The region is bascially bounded on the east by the pipeline corridor and has the Yukon River to the Southeast. We're going to cover this region over the next 2 days in six areas. The first area is Gates of the Arctic. The second is the Noatak-Kobuk. The third is Cape Krusenstern and Bering Land Bridge. The fourth is Selawik. The fifth is Kanuti and the sixth is Koyukuk. Richard Stenmark of the Land Use Planning Commission will give us a brief introduction to this region.

Mr. Stenmark. Richard Stenmark, Land Use Planning Commission. Northwestern Alaska as defined for a regional context covers about 100 million acres. This is generally west of the Trans-Alaska pipeline and northwest of the Yukon River. Included in this are the western Arctic coastal plains, central and western Brooks Range, the Koyukuk River drainage and Seward Peninsula. The area is bounded on the north by the Beaufort Sea, on the northwest by the Chukchi Sea, and to the southwest by Norton Sound of the Bering Sea.

Similarly to the northeast region, the boreal forest here gives way in the southern Brooks Range and also in the eastern part of the Seward Peninsula and with the tundra systems prevailing west of there. The precipitation is generally not heavy in these areas, but more falls in the mountains than in the lowlands. The Arctic climate—transitional climate on the coast and continental climates more in the interior. The region, while sparsely settled, has a larger population than northeastern Alaska, which we discussed the other day. Kotzebue, Barrow, and Nome are regional centers, each with populations over two thousand people. Aside from tourism, there is some guided hunting and fishing, mineral exploration, some small-scale mining and logging and limited oil and gas exploration going on in the region.

A few scattered roads are present at the villages, usually connecting airports with villages or in the case of the Seward Peninsula, a few roads out to Nome, but the State highway system does not enter into the area. Aircraft are the major means of transport with boat and barge travel during the summer on major rivers and along the coast.

Native corporations will hold about 15 percent of the region's land area. State selections currently total about 3 percent of the area with some additional selection likely. Federal Reserves are present in the region, the National Petroleum Reserve in Alaska, nearly 23 million acres, and the Chamisso National Wildlife Refuge off the Baldwin Peninsula, a small island area. National interest lands total area consists of Capes Lisburne and Thompson, proposed as wildlife refuge units; the Noatak River drainage, which has been proposed as a resource reserve and as a national preserve; the Baird Mountain east and portions of the Kobuk Valley, proposed variously as a national monument, national park, or as a national preserve; the central Brooks Range, proposed primarily as a national park; the Kanuti River area, proposed as a wildlife refuge; the large lowland basin around the village of Huslia, the Koyukuk area, proposed as a wildlife refuge and also as a part of a national forest, the Selawik drainage, proposed as a wildlife refuge; and the northern part of the Seward Peninsula, proposed as an ecological reserve and a national preserve. There are a few wild and scenic river proposals as well lying outside of these larger areas and these include the Unalakleet off Norton Sound, the Koyuk on Seward Peninsula, the Wulik north of Kotzebue coming into the coastal area, the Utukok, the Ikpikpuk in the eastern part of the Petroleum Preserve, the Colville along in this area, and the Anaktuvuk running north of Anaktuvuk Pass and also some islands that are proposed as part of the marine resources refuge and these include Fairway Rock, Sledge Island, a coastal bluff area here in the south side of the Seward Peninsula, Besboro Island, Stuart Island and Punuk Island just off of St. Lawrence Island.

The first area, then, we're going to address this morning is the central Brooks Range and the Gates of the Arctic Park area and that basically will cover the area, then, from the trans-Alaska pipeline corridor to the west over to include the Ambler River drainage on the south side of the mountains and approximately the Howard Pass area on the north side. To the south, pretty much takes in the Brooks Range down to the lower foothills and along the upper Kobuk River in this area and to the north, since some of the proposals do go up as far north as the Colville River, we'd better include most of this country in here in that discussion, especially west of the Chandalar River.

Scenic, Landscape, Historic, and Archeological Values

Mr. KAUFFMANN. I'm John M. Kauffmann, park planner with the National Park Service. The concept of a Gates of the Arctic Wilderness National Park stems from the exploration of the late Robert Marshall who wrote eloquently about the area in the 1930's urging that, "In the name of a balanced use of American resources, let's keep northern Alaska largely a wilderness."

Study by the National Park Service, which involved more than a thousand miles of travel by foot and canoe, have further ascertained the exceptional scenic qualities and wilderness values of the central Brooks Range. This is really a part of a last large corner of a wilderness left in the United States. These mountains are a northwestern extension of the Rocky Mountain system into Arctic Alaska and are made up of complex sedimentary and metamorphic formations folded, thrust faulted, intruded in places by igneous rocks and heavily glaciated in the past. The resulting landscape, stern and gaunt, perhaps seemingly stark at first viewing, has an unforgettable scenic beauty. This derives not only from the rugged landforms themselves and the contrasting effects of delicate vegetation spread amid vast space and craggy peaks, but also from the play of the low Arctic lights. This is often diffused or focussed by every-changing weather, so this is a land of rainbows. Although these mountains are not high by standards of other Alaskan peaks, they average between 5,000 and 7,000 feet above sea level of the highest mountain, Mount Igikpak in this region being 8,510. They are nevertheless extremely spectacular and impressive.

The landscape is veined by 20 large clear rivers and countless smaller rivers and creeks. These flow north and south and west as well, creating many convoluted valleys offering routes of travel in many directions, from high plateaus and deeply incised glacial valleys. The region is bejeweled by more than 100 lakes, including some that are very large and handsome. Walker Lake, for example, is a national landmark, and Wild Lake, Iniakuk Lake, Selby-Norvak Lake, rival it in scenic beauty. On the north side of the range where large mountain lakes are rare, the region includes four particularly large ones. Among the most impressive is Kurupa Lake, watched over by a huge crag of limestone.

The Brooks Range in this region is a meeting place of Taiga and tundra, the boreal forest reaching up from southern valleys to meet the open landscape of the Arctic divide and Arctic slope. This area includes quite a bit of the southern slopes of the range, which of course is more lush, more varied in vegetation in many ways than the northern region.

In flying over this country with its accordant mountain peaks and successions of drainages, one could conclude that the scenic values are apt to be repetitive. This is not the case. There are distinctive differences, valley to valley, east to west, and north to sough. Subtle variations on the basic theme of Arctic mountain scenery. The gothic grandeur of Mount Dooneak or the majesty of the Gates of the Arctic themselves, for example, are quite different from the goblin pinnacles of the Arrigetch Peaks or the big tilted layered masses around Cockedhat Mountain. The stately Valley of the Reed lush with vegetation presents views far different from the stark sweep and the big skys of the Arctic foothills. The gentle hills of the upper Noatak Valley have a serene New England aspect over the spires of the Angiuchun Mountains standing on the horizon.

I'd like to emphasize that the greatest resource which this proposed area offers is space—space for wandering, space for solitude. It is more than a collection of scenic features. It is an integrity of landscape, its size commensurate with the requirements of its ecosystems and the breadths needed to realize its recreational and inspirational opportunities. Thus the whole is much greater than the sum of its parts. For several centuries, we've benefited from such space, beckoning the frontier experience. Arctic Alaska is the last such frontier and even it is being circumscribed by development. Big, wild beautiful landscapes like this, conducive to primitive travel and sojourn stretch no farther under the U.S. flag. The Brooks Range offers a final opportunity to perpetuate a landscape for discovery, the challenge, the adventure. This is our ultimate scenic wilderness.

Mr. Quarles. Thank you. Anyone else on scenic values? Yes?

Mr. Dapkus. Dave Dapkus; Heritage, Recreation, Conservation Service. I'd like to talk about five rivers that are within the Gates and I'll start along the south and east which is Tinayguk, a south-flowing river. The Tinayguk has several values. Probably its most outstanding is its recreation. Backpacking and hiking are great up in the upper reaches of it, across over to the pass. Float boating is the key to the Tinayguk and north fork of the Koyukuk. It's a kyaking and canoeing stream. Mostly class 2 water and good long sections of class 3 water—makes it good for the experienced boater. Another value, as John has already said, is its scenery and I think the key notes at Tinayguk, north fork of the Koyukuk, at Pritchard Crags and Boreal Mountain, which are the Gates, travel this river. The rest of the mountains are very beautiful. There's big rock outcroppings along the river and the names of just a few of the mountains give you an idea of the colors one might see. There's Grey Mountain, Red Mountain, and Black Mountain. These all add to the beauty. Also, the fact that you start in alpine tundra country and go down into forest country adds to the scenic beauty. The third value is the variety—as is the case of most of the Gates—of the fish and wildlife resources, particularly the wildlife.

From that one, I'll head a little bit to the west and talk about the John. The John's outstanding value is its scenery, its good variety, high relief, trees and vegetative cover, much exposed rock and cliffs and outcroppings. The thing that makes this scenery particularly nice is that it is a good family float stream. From the Hunt Fork, at least, down, it's all class 1 water and so practically anyone can get in and have a good look at it. Above the Hunt Fork is class 3. It's a little rougher. The third value would be its wildlife and only one thing I'd mention, because of the fact that it's got a variety of wildlife, this is a major migration route of the Arctic herd, coming up the Anaktuvuk and past the villages to the pass and down the John.

Then continuing a little bit further to the west, we come to the Alatna. The scenery here again is beautiful. What makes it particularly distinctive is the Arrigetch Peaks which look like axheads sticking up into the sky. They're not too high, as John has said, but they're very, very rugged, bare mountains and can be seen from about the upper half of the river, anywhere along it. It's a good float stream. Some class 2 water, mostly class 1. For a somewhat experienced family—they can have a good time on it. Also, on the upper end, it's excellent hiking in alpine tundra country and the thing that I like to note, of all the areas I've floated in Alaska, that the Alatna has the greatest variety of wildlife that I've ever seen, not necessarily in numbers alone, but just variety, which makes it outstanding. It all can be seen from the river.

Continuing on to the west, we come to the Kobuk which is—all of these are south-flowing streams. Here again, the scenery is outstanding. The scenery is different in the Kobuk. You've got the big mountains you're looking up at, but you also start out in

Walker Lake, which, as John said, is on the National Register of Natural Landmarks. The upper Kobuk is also different in the fact that it runs through two canyons, an upper one and a lower one, both very narrow and incised and very beautiful. Then the lower part of the river, you get into one of the largest areas of open spruce rivers that adds to this scenery, gives it variety. The Kobuk, particularly further down, is also important to Native history, archeological finds, which you'll hear about later when we talk about the Kobuk area.

And third, I'd like to talk about its recreation. Here again, it's a good float boating stream, mostly class 1 water, but in the canyons and the upper part, you have class 2 and some class 4 water, which makes it very rugged. Hiking is another recreational value, along with the great variety of wildlife, and one of the special things in the wildlife is the sheefish. The Kobuk is noted for its sheefish and this is particularly important to the Natives. The little note I had—that the sheefish here get upwards of 60 pounds as opposed to other parts of Alaska where 25 pounds is the average.

I'd like to jump over to the north side of the proposed Gates. The Killik River. Its outstanding value is probably recreation. The Killik is a good float boating stream. It has a variety of water from 1 to 4 four, lots of class 2 and 3, and because of its distance and, its what we like to call, rock gardens, a variety of water that is really good only for the experienced kayakists or canoeists. Another interesting thing about the Killik and its recreation—it's not only good for hiking, but in recent years, there's been a lot of ski touring during the winter in the open valleys. You can jump from the Killik over to Nigu and then down into the Alatna, as I mentioned before. Its scenery, once you get out of the mountains in particular, is noted by its glaciation, a lot of lateral range across the river and the winds coming up from the Arctic coast have blown up big sand dunes, particularly along the middle part of the river, some of these 200 feet in width.

With that, I'll leave the Gates. There is one other river we'll talk about later in the Noatak Preserve. The Noatak actually starts in the Gates and runs for a few miles, but most of the river lies in the Noatak. Thank you.

Mr. QUARLES. Thank you. Rich.

Mr. GORDON. Wilbur Mills and I would like to split this presentation to save time. We will not discuss the spectacular well-known features that are known to everybody.

Two general concepts: First, looking at the central Brooks Range in the statewide perspective, the lack of eccentric glaciers today, and the number of valleys radiating out in all directions gives this particular portion of the Brooks Range a larger number of clear water, fairly small rivers flowing through it and from it than any other high mountain country anywhere in the State of Alaska and I think the values of these rivers have been made clear. This is the best.

Some of the proposals include portions of the foothills zone, both on the north side and on the south side. The other mountain parks, for the most part, particularly in the lower 48, generally just include the mountain core. The concept of an ecological transect across the montains is a key value of this proposed park. From a climactic perspective, the gradients across these rim—the top of the Brooks Range here is steeper. You can see this on a climactic map of the central and west central Brooks Range, than in any other part of the State of Alaska except along the coast and therefore, the vegetation and climate, some aspects of the scenery, differ radically within a short distance. The foothills also have quite different ecology if you talk about the lower plants and the bird life from the tundra and the mountains. So the foothill zones are extremely important on both north and south of the values of this park.

OK, specific areas from their visual importance and I'm speaking selectively to represent various types of landscape from the northwestern portion clockwise around to the southwestern portion. First of all, the Imurak Pass-Howard Pass area. This is in the administration Noatak proposal in part. It's in the Coalition's Gates proposal. It overlaps into the National Petroleum Reserve. You can readily see it on the map. The Petroleum Reserve has a thumb which sticks right up into what otherwise would be the heart of this Noatak Gates of the Arctic proposal, right at the headwaters of the Nigu River, the Nigu being on of the two upper forks of the Etivluk and it is in an area of high rolling plateau country. One of the unique features from a visual or a recreational perspective is that there is a high series of rolling basin country, low mountains that you can travel from east to west for 150 miles from the Nigu and west, all the way east to Anaktuvuk Pass with very high rugged mountains to the north and the south, but this gentle, easily traversible country going east-west right through the heart of the Brooks Range. The Imurak-Howard Pass area itself separates mountains into distinct blocks which is not evident in other parts of the proposal area. The passes themselves contain a number of scenic lakes. The passes are famous and very important to the people of Anaktuvuk for concentration and funneling of the caribou during migration.

Also—and the Park Service can expand on this if you like—a major archeologic find has been discovered along the upper portion of the Nigu River, not too far from the river. It looks like one of real national significance. This again is within the northern part of the National Petroleum Reserve (NPRA). The headwaters of those rivers are varied with outcropping bedrock along the valleys with a number of rather surprisingly scenic mountain lakes where the Alatna, the Killik and the Nigu all come together to a head and this is the southwesternmost point of NPRA, which is why we feel that that particular portion of NPRA so much relates to the park proposal.

The next area is Kurupa Lakes and simply let me quote from R. L. Getterman, U.S. Geological Survey. He did a landform study of the Arctic lowlands region and he included in that the mountain front of the Brooks Range:

> This site (the Kurupa site) contains the most spectacular scenery in the Arctic lowlands. Two long, narrow, deep blue lakes at the foot of the massive rugged mountains, grey limestone cliffs along the south shore, varied colorature along the north side, and highly folded strata on the valley walls.

The next area is the Killik River. We discussed the recreational significance. A number of the valleys in this portion of the Brooks Range are exceptionally wide-bottomed and exceptionally steepsided, giving a somewhat spacious effect, the feeling of a canyon which you would expect a much larger river to be flowing through than the one that's flowing through it today. That is, in part, because the glaciers caused larger rivers to flow in part of these valleys, but, in part, I think it's a matter of the geology. It gives you this feeling of very high walls because the sides are very steep with flat bottoms.

As Dave indicated, there are sand dunes which are not only 200 feet abreast, they're also 200 feet in height. Mostly stabilized—portions of them are not stabilized and while I think of it, one of the outstanding wolf-denning areas in the Brooks Range is in these sand dunes. It gives good material for burrowing. The foothills right at the margin of the mountain—a narrow foothill belt—are very striking. Very pale colored rock, very dramatically eroded—a miniature Badlands providing a stark contrast to the rugged, darker limestone of the mountain front. This is one of the areas in the front of the Brooks Range where these features of the foothills are compressed and they're very striking and visible. The other value is that there are a number of land forms on the lowland plain or on the foothill plain that are characteristic of the western foothills—steepsided, flat-topped mesas. There's one particularly of note just immediately west of the middle Killik and very, very steep rock bluffs along sections of the river. From the tops of these bluffs, one has much the same impression one gets from the Great Plains—same type of visual experience because ecologically this is comparable to the mountain front area of the Great Plains.

The next area is Wild Lake going around to the south side of the eastern portion of this proposal. Wild Lake is different than most of the other lakes. It is a fairly long, narrow lake, very narrowly enclosed in mountains which are vegetated. So it has a rather warm, approachable feeling about it and it is much more deeply inset in the mountains than most of these lakes. Therefore, it has a visual appearance of being totally surrounded by mountains and very, very tightly enclosed. There are very attractive beaches on the west shore of this lake.

Next, the John River. I just want to point out one feature which is rather distinctive. There is a bedrock canyon along the John River, just about Crevass Creek, which is carved in massive, rather pale grey limestone. Moreso than most of the other canyons in this section of the Brooks Range, it is more nearly V-shaped, due to very intense recent downcutting, than most of these more U-shaped glacial valleys. It's a matter of degree, but this is a striking character in this area.

The Alatna River is most notable for the canyon portion in the middle river. The canyon starts approximately opposite Arrigetch Creek. At that point, in addition to seeing the granitic intrusion of the Arrigetch up the side valley, you have canyon walls of a variety of rocks. Perhaps most striking in the upper canyon is sort of a pastel color of orange, yellow and limestone. The valley here is wide. The limestone walls rise in sort of hummocky layers. The river is probably the classic example in the State of Alaska of a meandering, maturely incised stream—incised isn't the right word—maturely imposed stream meandering very gentle between very high mountain walls. Most of the mountain streams, of course, are much faster. This gives the visitor an opportunity to experience the mountains without having to think very much about problems of traversing the river itself. The lower part of the so-called Schist Belt which here is an extremely striking area of rather blue-purple, very finely layered metamorphic rocks—meta-sedimentary rocks—with the layers varying from white to sort of a dark purple. Very, very sharply contorted. There are lake-like sections of the Alatna here in which these mountains are reflected and it's one of the more striking scenes in the Brooks Range.

The third aspect of the Alatna River Canyon—or the Alatna River below the canyon is the foothills. Here, you travel—this is not the only place, but it's one of the more outstanding ones—you travel through New England-like foothills which are tundra capped and heavily forested along the slope.

One ecological character which is unique and this sounds pretty trivial, but I'll explain why I'm mentioning it is that in this area—this far north, for some reason, the ecological tolerances of the alpine bearberry are such that it grows right on the forest floor. Everywhere else in Alaska that I know of to the south, the alpine bearberry is an alpine plant. The reason this is so significant visually is that of all the plants in Alaska, the alpine bearberry is the one that turns the most brilliant colors in the fall. It's a very vivid, intense orange-red. Everywhere in Alaska in the fall in the interior, you have the contrast between the green in the spruce forest, the yellow of the cottonwoods along the stream if they're big, and the orange and the white birch trees scattered among the dark green of the spruces on the slope. Here, you have the added feature combined and intermixed of this brilliant, vivid orange-red with those other features and this, I think, makes the foothills along the Alatna and presumable elsewhere along the southern edge of the Brooks Range probably the most visually striking fall colors of anyplace in the State of Alaska.

Finally, the Selby Lake area, there is a spur of the Brooks Range called the Angaucha Mountains immediately south of—an east-west narrow spur immediately south of the Schwatka Mountains, the major range. That spur is not a high elevation, but it is exceedinly starkly glacier carved and this is very spectacular.

During the Pliostocene, large glacial rivers drained from the Brooks—from the main Schwatka Mountains and cut very deep-sided rocky canyons through the Angauchan Mountains. The series of lakes through these mountains differ from all the other lakes in the central Brooks Range in that they do not lie at the base of the mountains. They lie in these canyons. Selby Lake—Selby Narvak is probably the classic example of this. It is really one lake with a long, tan gravel spit separating it in two parts. It is in the canyon, rock walls, and its most striking visual feature are a series of very sharp pinnacles rising several thousand feet directly above the lakeshore. That's all I have. Wilbur Mills will carry on here.

Mr. MILLS. Wilbur Mills, Alaska Coalition. I'd like to mention a little bit more about the lakes of the Brooks Range. John Kauffmann said that there are over a hundred in the Gates of the Arctic area alone and this is probably certainly true, but I think if one looks at just the larger lakes—the large, deep mountain lakes which are of glacial origin—one comes up with a lot fewer number than that and I think it's these larger lakes which are going to be where the major attraction points for any national park established in the area. In looking across the entire 600 miles of this, the Brooks Range has significantly fewer of these large glacial lakes than most other mountain ranges that have been heavily glaciated. And if one looks at the total 600-mile width of the range, I'd come up with just 24 of these lakes, using the correct area of a square mile in surface area. So I think that these are really unique, outstanding features of the area.

Breaking down these 24 lakes under the present land status and land withdrawal system, I guess that there are 2 protected within the current Arctic Wildlife Range, there's 1 in the pipeline corridor, there are a total of 13 in State selection areas and in Native areas, and only 7 within the (d)(2) areas.

So I think it's significant that the committee take a serious look at these lakes and attempt to come up with a reasonable number—an equitable distribution that would be protected within the Gates of the Arctic Park, for instance, because the greatest concentration of the lakes do occur in the central Brooks Range. I think the North Slope lakes are particularly significant. These are absolutely unique. You have these large, glacial, deep mountain lakes in a total alpine tundra environment and as John Kauffmann mentioned, the Krupa Lakes are really significant and most of the other lakes along the north of the mountain front are also very significant. And also, again, going over to the south, we have the same situation. There are a number of lakes that are proposed in the Alaska Coalition proposal that I feel strongly should be included within the Gates of the Arctic Park.

I'd like to talk a bit more on the Kobuk River country which Dave Dapkus has already mentioned quite a bit about, but I'll maybe add a little bit to that. He mentioned the spruce forest. I think the spruce forests in this area are truly exceptional. Of all the areas I've visited in the Brooks Range, I haven't seen any that compare with the upper Kobuk in just extent and size of the trees and very impressive vistas.

When floating down the Kobuk River, there are many areas where you have knolls and ridges of just open birch forest with blueberries and cranberries and lichen groundcover which present really dramatic vistas looking northward, particularly across the Anganucha Mountains where you just look across a sea of spruce forest and this is a very unique and interesting feature of this upper Kobuk country. The Schwatka Mountains in that area north of the Kobuk lying between the Kobuk drainage and the Noatak are also very, very scenic. The area is composed largely of metamorphic limestone which forms some of the most impressive scenery in the Brooks Range and I think that the Schwatka Mountains contain some of the most outstanding. As you drop into the very headwaters of these valleys, there are deeply incised gorges that lie between the Kobuk and the Noatak and the river valleys like the Ambler, the Kogiluktuk, the Menilik and Reed Rivers are all very outstanding. These are moderate-sized drainages. They're generally shorter and they're carved and narrower valleys than the south-flowing rivers of the Endicot which lie to the east. And so consequently, they offer a different type of experience.

Many passes at the headwaters of these rivers lead into the Noatak Valley. I think the Ambler Valley is particularly outstanding in this regard. The upper Ambler and its major tributary, Ulaniak Creek, have five passes that lead into the northward-flowing tributaries of the Noatak Valley and this, I think, offers exceptional opportunities for hiking and recreation in that area.

I might mention that as one traverses northward from the Kobuk to the Noatak, you start off in lowland spruce forest in the Kobuk area and you move into upland spruce forests. From there, you move to alpine tundra and then in the Noatak itself to moist tundra and this is just a distance of 70 miles. You've got a very wide latitudinal gradient of ecological types in a very, very short distance. If one were to go further east into the Endicot, it would almost take twice that amount of distance to traverse the same ecological types.

I'd like to say a bit about recreation and just give one example to kind of dispel the idea that it is very, very expensive to get into these areas. I've been going into the Brooks Range for 10 years now—both planning trips, guiding other people, and also on my own, and I don't know how such an idea has become engrained in people. It simply is not a very expensive area to visit and breaking down one example, I used a float trip in the Kobuk River. I figured it for a party of five people doing a 2-week trip. The jumping-off place for the Kobuk float trip is Walker Lake and usually you use Bettles as a place from which to reach Walker Lake. Figuring from Fairbanks, the airfare from Fairbanks to Bettles is $48 per person and for five, that would be $240. Air charter from Bettles to Walker Lake takes 1½ hours for the round trip with a Cessna 185 at $125 an hour. It would require two flights to fly people and their gear, rafts and float boats to the lake and that's a total of $380. The airfare, then, if you float 110 miles from Walker Lake, say, down to the village of Kobuk—you could go farther down to Ambler or Shumnak or Kiana—but 110 miles to Kobuk and then fly back to Fairbanks, it's $85 per person which adds up to $425. Then food and depreciation on equipment—I figure I used $4 per day per person and that comes out to $280. Then freight for boats and for gear, over and above your baggage allowance on the aircraft, would be an additional $60 which adds up to a total of $1,385. If you divide that five ways, that's $277 per person. Even if you wanted to stay an additional week, the only additional expense you'd have, essentially, is food and that would be $20 to $25, so for $300, you can get a 3-week—an outstanding wilderness experience under $300.

Mr. BEVINETTO. That's assuming you magically materialize in Fairbanks?

Mr. MILLS. Right. Well, I mean, you know, you can't figure from everywhere in the country.

Mr. MILLS. I'd like to make one brief mention about the north fork of the Koyukuk. I think one thing that Dave Dapkus didn't say is that within the proposed areas, the north fork is the only south-flowing river that has its total drainage completely within the park and, I think, this is one of the outstanding opportunities in the Brooks Range to protect an entire drainage and I think the north fork is one that really deserves it.

Mr. **Gray**. Charles Gray representing the Alaska Professional Hunters Association. Just a couple brief comments. I've spent quite a bit of time in the Brooks Range since 1952, fishing, hunting, and guiding. I've camped at Trader Lake when it was 58 below zero and I sweltered in Kobuk Valley in the summertime. In short, I've covered most of it over the years. One thing that strikes me is the fact that aside from a few outstanding landmarks such as the Arrigetch Peaks, most of it looked pretty much the same and if I were to forget where I was at any given time and look around, I'd have a hard time spotting landmarks and that type of thing that would definitely establish that I was in a certain profound area.

For this reason, I don't think it's necessary to set anywhere near all the Brooks Range aside as a national park because almost any areas are representative. Granted, the Park Service has long sought an area or areas there for a national park and out of deference to Robert Marshall, I suppose we're obligated to set something aside. But my point is that I don't think it needs to be a very large area in a national park status and also, I'd point out that it's obvious to anyone that's spent any time in the Brooks recently, particularly in the Arrigetch Peaks area is that that area is becoming the garbage can of the Brooks Range due to the backpacking and the interest anymore in getting to that spot and going up the valley and taking a look at the mountains or the peaks there. So therefore, I'd just point out that the hunters, I believe, have left the area relatively unspoiled and only slightly touched over the years and it's when we have a concentration of interest in a certain area, we have a very definite lowering of values to the land there. Thank you.

Mr. **Wetzel**. My name is Dan Wetzel. I'm a registered guide and graduate wildlife biologist. For the past 10 years, off and on, I've made my home at Crevass Creek north of Bettles on the John River and I would like to address one of the values of scenery that seems to be overlooked. While some of the gentlemen here from the Federal agencies may have traveled 1,000 miles during the course of the years studying the Gates of the Arctic National Park proposal, I travel 1,000 miles during a 3-month season on foot and on horseback and I've traveled the depth and the breadth of the Brooks Range by riverboat and by dogteam and by airplane.

I would like to say that the boundaries of the Gates of the Arctic National Park as proposed—as a biologist and I recognize one geologist and one biologist in the audience, also—do not represent ecosystems. They represent mountain ecosystems. They represent scenic ecosystems. If ecosystems were, in fact, represented, then the Noatak wouldn't be cut in half, all the south-flowing rivers wouldn't be cut in half, and if they represented ecosystems, the foothills of the north half of the Brooks Range would be included, which they are not. The foothills represent the area between the northern boundaries and the Colville.

What we seem to be implying with the magnificant scenery—and the gentleman that preceded has done more than an adequate job of describing it and I'm well familiar with the scientific literature that goes into even more detail—the scenery seems to be directed toward, and the land use scheme that has been proposed seems to be, protecting and allowing one type of use—one type of appreciation—of this scenery. But there are many types of users that are motivated to go to the Brooks Range to appreciate this scenery. I book hunters every year who have traveled the world round hunting and they spend a lot of money doing it. I booked one fellow this year that shot sheep throughout the world and he's going on another sheep hunt because he wants to see the Brooks Range. He's one type of user that appreciates what is unique about the central Brooks Range. There are many types of users that appreciate the scenery that want to go there. They want to fly and they want to hike. They want to go on horseback. They want to go on riverboats. They appreciate the uniqueness of that Arctic system—what has been delineated, which is only part of a system. So what I'm saying is the land use scheme that we implement to protect the surface values of this scenery should not obviate many of the other types of uses that the total Park would, in fact, do.

Mr. QUARLES. Thank you. One more comment. Jim?

Mr. WICKES. Jim Wickes, Department of Natural Resources. There is hot springs on the Reed River, one of the two known in the Brooks Range. It's a nice recreational feature. Thank you.

Wildlife and Fish Resources and Uses

Mr. QUARLES. All right. The next topic is wildlife and fish resources and uses.

Mr. BISHOP. Dick Bishop, Department of Fish and Game. The central Brooks Range, as several people pointed out, is important recreationally for a number of different reasons and I'll address just some of the major considerations that relate to wildlife. The major species involved are caribou, the western Arctic herd ranges through this area and numbers approximately 75,000 at the present time. There are major migratory passes through the Gates of the Arctic Park proposal area. The southern portions and occasionally some of the northern portions are used as wintering areas, breeding grounds. The Anaktuvuk Pass, for example, is based on one of the major migratory routes. This is generally high quality habitat for caribou.

This is one of the major areas, probably the most important area in the Brooks Range for Dall sheep. The habitat is moderate to high quality. It supports a reasonably high number of sheep. There are perhaps 17,500 to 20,000 sheep in the Brooks Range and this area probably supports 35 to 40 percent of that number.

Grizzly bear are another important species in the central Brooks Range. They are of low to moderate density for the Brooks Range and similar habitat. The reports of density are considerably lower than the southern coastal regions where feed and so-on is better. It is good quality habitat for other bears in northern Alaska. For northern Alaska, that is, it's good habitat. The limiting factors on their numbers are food availability and this reflects the relatively harsh climate. Black bears are low density. This is principally not their kind of habitat and the southern portions of the Brooks Range are essentially the northern edge of the black bears' normal range in Alaska.

Moose are low to moderate density in this general area compared to other parts of northern Alaska. The Brooks Range and the foothills and so on are used primarily at spring, summer, and fall habitat and there seems to be some movement southward of moose during the wintertime.

The area represents good to excellent habitat for wolves and their numbers vary, depending on the various circumstances. It contains important denning areas for wolves. The densities may range from one wolf per 60 square miles to one wolf per 150 square miles. They may be inclined to wander and change their ranges according to feeding conditions. And also this is particularly good habitat for wolverines. The numbers are, for wolverines, relatively abundant in that area. However, they never do reach high numbers.

In addition to those major species, of course, there is a full complement of other Arctic and sub-Arctic fauna that comprise a part of the whole for sure and are important in various ways. I won't mention those in detail.

Some of the important human uses include subsistence use of caribou, which is undoubtedly the most important animal for local or subsistence use in that area, particularly to people of Anaktuvuk Pass and to some extent, the people from other areas. However, it's generally quite a ways from any other settlement and so is not used as greatly by people from other locations for subsistence type use. Of the 75 or so thousand caribou in the western Arctic herd, the subsistence type use is now considerably reduced to somewhere on the order of 2,500 to 3,000 and sport hunters take perhaps 50 to 100. Prior to 1975 when the herd was substantially larger, over 200,000 animals, subsistence users took up to approximately 30,000 animals annually and sport hunters 100 to 200 or perhaps a little more.

This portion of the Brooks Range has been mentioned already several times. One of the most popular areas in the Brooks Range for recreational use, including sport hunting, hiking, boating, and other purposes. And this use, I know, has increased greatly in recent years. This area, in fact, has probably received the greatest increase in recreational use of any portion of the Brooks Range. Commercial uses include trapping and outfitting and guiding, transporting recreational users for sport hunting, boating, and hiking. The trapping principally supplies income to local users and, again, today I would note that in talking about what is commonly referred to in various legislation as commercial trapping as opposed to subsistence trapping—that is, the pelts are sold for cash rather than being used directly for personal use, although that also occurs. We expect that the trapping will probably remain relatively stable and perhaps decline, depending on other circumstances. However, outfitting, guiding, transporting recreational users can be expected to continue at the present rate of increase. This area is of particular importance for sport hunting and related uses, both by residents.

There are about 26 with registered guide areas under the State system now in the Brooks Range and of those, 12 have areas in the central Brooks Range, so it is an important area from that standpoint. It's also important, of course, from the standpoint of use by residents of the State and, in general, that use for sport hunting as well as other recreational purposes has been increasing over the past few years.

There are some considerations as far as movements of major game species through or in and out of that area. The principal and most spectacular one, of course, is the movement of caribou—the western Arctic herd—that I mentioned earlier from the calving and summering areas on the North Slope through major passes in the Anaktuvuk area and the Killik River and other major drainages as far west as Howard Pass. In the fall or late summer, they're moving through the Brooks Range into wintering areas that may be in the Brooks Range as well as south of the Brooks Range in the Kobuk River and the upper Koyukuk and that general area.

Some of the other comments that I can make as far as potential considerations with regard to use of that area by various people, both local and otherwise, relate to potential constraints on access to that area.

For example, if snowmachine uses were curtailed, it would involve curtailing the common and most popular mode of transportation by local people at this time. It's widely used for hunting and trapping by people that live in or near the area. In addition, of course, constraints on aerial access would affect both hunters and nonhunters alike, depending on the degree to which that constraint was applied. Some of the other impacts that that sort of thing may have is that we, for example, have spent a fair amount of time doing surveys of various kinds on wildlife species in the area and, if we were unable to use light aircraft there, then that would mean that we would not be able to continue with that kind of work.

The potential of major pipelines and that sort of thing in that area has to be carefully considered from the standpoint of welfare of wildlife. There is a possibility which is still not completely proven, but the disturbances or obstructions that may occur as a result of pipeline or road development can have effects on the movement patterns and the survival of some species of wildlife. In particular, there's the seasonal possibility of some impact on caribou of importance which was mentioned earlier in the discussion about the Arctic wildlife region. I'll close my remarks there.

Mr. IMESON. Have you reached any conclusions about why the caribou herd in the area is down?

Mr. BISHOP. Well, someone else asked that question during the break and the basic problem that we don't understand is why production and survival of the young has not maintained a fairly high level—an adequate level. It hasn't, but we don't understand exactly why. It may be a range thing or it could even be disease-related and there are various significant diseases, but we haven't been monitoring it closely enough to know what the circumstances may be. But given for recruitment of animals into the population, the overall losses between hunting and predation are certainly adequate to produce that decline. So whatever kicked it off as far as the lack of adding to the population at an adequate level with the circumstances that have created a fairly rapid decline in that population involved taking both by predators and people.

Mr. QUARLES. Anyone else on wildlife? Rich?

Mr. GORDON. I want to talk about the Killik River, specifically, and then one general concept. I've already mentioned that the poorly consolidated dune areas which are just inside and extend outside the mountains are excellent areas, according to Bob Stevenson, Fish and Game, for wolf denning. There are interestingly quite a different small bird fauna between the tundra in the mountain valley and the tundra in the foothills. I won't go into detail except to say that it's quite striking. There are high bluffs along the foothill portion of the Killik. One of the high bluffs, at the present or as of the past few years, actively supports a small population—or to be exact—three large Dall sheep rams which is rather interesting in the foothills. The river is excellent for rafters. There are gyrfalcons, golden eagles, rough-legged hawks along almost every bluff along the entire river. At the mouth of the river where it joins the Colville, there is an actively reproducing peregrine falcon nest as of 1977 producing young. The number of peregrine falcon nesting on the Colville that are producing young now is very low, so this is a very important area for the raptor.

Finally, there's a caribou concentration. At least, there has been in the last few years, immediately along the mountain front—the foothills adjacent to the mountain front—between the Kurupa Lake area and the Killik River. We saw 1,500 concentrated in that area in midsummer, 1976. The Park Service, I believe, saw about 2,000 in the same area in 1977.

One overall concept—I had mentioned that statewide, my concept, as least, five great ecosystem-oriented sanctuaries that we would like to see established. There is only one of those five in the northern half of the State of Alaska, which is kind of too bad, but that's the only opportunity available. That one is the Gates of the Arctic. This a place that Congress is just going to have to let go of because if there's any true sanctuary anywhere in the northern half of Alaska, this is the logical place for it. We totally recognize the use by Anaktuvuk village, including support of the established means of access. Also, the Koyukon villages along the southern streams on the Alatna and the upper Kobuk, but given that inconsistency, otherwise, this is the great opportunity for a large quasi, at least, ecosystem oriented great sanctuary in northern Alaska. Thank you.

Mr. QUARLES. Anyone else on wildlife values?

Mr. KAUFFMANN. John Kauffmann, Park Service. Mr. Chairman, it might be helpful to try to throw some perspective on the hunting that Mr. Bishop mentioned. It's difficult to get a accurate handle on, or view of, the hunting up here in view of the fact that three game management units come together and the sheep harvest records, in particular, are grouped by drainages, some of which are in and some of which are out of the proposal area. Nonetheless, we researched the records to try to get an idea of what's going on or has been going on up there. And we found that in the 3-year period from 1973 to 1975, an average of about 200 hunters, including about 60 nonresidents, take about 100 sheep a year on the average. This would be about 55 percent of the hunters utilizing the entire Brooks Range and about 7 percent of the statewide sheep hunters. The harvest there amounts to about half, or a little more than half in the Brooks Range and about 9 percent of the total statewide harvest. The records indicate that the harvest has been declining in past years by almost 50 percent. We're not quite sure why this is so and perhaps the Department of Fish and Game has a better idea. These are their records and if we have not analyzed them correctly, I'd hope that they would be invited to submit an official statistical report on how they see the hunting picture in this proposed park area.

The grizzly bear—the records are not kept by small area, only by game management unit. The average for the whole (d)(2) unit is about 65 grizzlies a year or about 8 percent of the statewide total.

According to State officials we've talked to, success is about 1 in 3 or 4, which would put the number of bear hunters in the Brooks Range as a whole in the 200, 250 range. Many of them, I suspect, are the same hunters who are after sheep. They go on a hunt for a combination hunt of one or more animals. Thank you.

Mr. IMESON. Could we get a copy of your study?

Mr. KAUFFMANN. Yes.

Mr. SAM. My name is Ronald Sam and I'm from the village of Alatna. While you're on the subject of wildlife, I'd like to say that we don't much care where you put the boundaries and designate all these areas, but the average family income in a small village like Alatna runs about $3,000 or $4,000 a year and the value of wildlife to these families is, you know, immeasurable. We need about one or two moose a year to live and that's our main food, is moosemeat, and so the value of wildlife to small villages is immeasurable and we need them to live. The position Alatna took on these boundaries is that we didn't much care either way what or where the boundaries are designated. What we are concerned about is the traditional use of these lands. We have gone up into the gates of the Arctic Wilderness Park area. We hunted out of there and all around the village and we're concerned with the area around Kanuti. We do hunt and trap out that way. What we want is to see that our resident villagers have their traditional use and subsistence hunting.

Mr. QUARLES. Thank you. Yes?

Mr. GRAY. Chuck Gray, the Alaska Professional Hunters Association. I thought Dick Bishop's presentation was good as far as the wildlife goes in the Brooks Range. I would just point out that on the average, with the exception of caribou, which commonly go over long periods of time in high and low cycles, that the game is relatively low in number in the Brooks Range compared to areas in central and more sourthern Alaska. We certainly recognize that there isn't enough land game in the Brooks Range to even supply the subsistence needs of the Native people if they can take it at the level that they would like to and I think that the crash of the Northwest caribou herd is an example of this. 250,000 caribou crashing now in 3 years to 70—to 60 to 75,000 and this is not an uncommon occurence. The same thing happened in the late forties. At that time, the Fish and Wildlife Service, who had control of fish and game in Alaska before statehood, jumped in with a very extensive predator control program and in a matter of a very few years, they turned things around. The caribou were coming back rapidly and reached the peaks that they did in the early seventies. For many, many years, caribou were practically unknown to the people of Barrow, but until the recent crash when they were readily available a few miles out of Barrow every winter and this type of thing.

I would also point out—Mr. Bishop was very kind in stepping around the point that the present problem there is largely because of the Federal Government's intervention and that the State cannot exercise as much control as they would like to on the situation of the caribou there now and the problem will not be turned around nearly as soon as it could be if they were able to exercise predator control. The only tool left to them is to cut out the human consumption and without the predator angle, it'll be a much longer time of turning things around. Why the animals collapsed so suddenly is perhaps of a speculation, but we do certainly know that there was a large buildup in the wolf population and the predation is significant. But even more so than that, the human take increased very rapidly due to several circumstances, partly that the caribou for a number of years made the mistake of sweeping pass villages where they don't always every year and then certainly of note is the fact that a Korean market developed for caribou horns so that we know that there was a large take of caribou that were wasted as far as the meat goes.

I might also point out on the subject of wildlife that in considering things that could be done in bills on wildlife in the Brooks Range, consider the fact that in Alaska overall about 80 percent of the subsistence needs of the Native people is met by the marine mammals and only about 20 percent by the land mammals. I think this is significant. Perhaps if the Native people are going to be given use in certain areas that would be closed to other people for subsistence, it would be practical to let them have use of marine mammals and this should supply a large part of their need.

One other point that Mr. Kauffmann brought up. On the animal take in the Brooks Range—I think he was roughly correct, but there are some human problems involved when you simply scrutinize game hunting reports and that's that hunters do not like to honestly tell where they get this game and I think this has quite a bearing—we know it does in some cases—on where game reports have been reported as being taken.

Mr. SHIVELY. I'm John Shively. I'm with NANA Regional Corp. I'd like to make just one clarification. There is no market for caribou horn in the Orient that we're aware of. There's a large market for reindeer horn. Caribou horn, in order to be marketable in the Orient, has to be taken at a very definite time, which is right in July and it's just not relevant to the caribou hunting. Nobody I know hunts caribou for horn except for sports hunters who want the racks.

Mr. QUARLES. Yes, go ahead.

Mr. MILLS. Wilbur Mills, Alaska Coalition. I just want to emphasize that I do feel that there is a strong need for a sanctuary type reserve in the Brooks Range and the Gates of the Arctic is the logical place to put it. I think there's no question that hunting does affect the behavior of wild animals, especially the ability of people to observe them, things like that. And I want to emphasize that I think the boundaries of the reserve should approach as closely as possible an Arctic ecosystem, that is, taking into consideration the full diversity of habitats that are available up there from North Slope to mountains to South Slope and I think it's important that the boundaries be large enough so that the entire life cycle, winter and summer, of various wildlife species be encompassed within the park because some of these species, of course, are very migratory in nature, especially predator species like bears and wolves and wolverines. The park should contain areas where prey species spend their entire life cycle, which in turn would give a high probability that species such as wolves would remain within the park boundaries year-round. I think this is significant for humans to be able to observe these unhunted, undisturbed wildlife populations.

Mr. IMESON. How many professional hunters utilize the area that we're talking about?

Mr. GRAY. I'm prepared to present—I thought under the economic part of the conversation, but I'll do so now if you want me to.

Mr. QUARLES. This would be the place to have it presented, yes.

Mr. GRAY. Then I'd like to present a map or leave a map with you that shows the guiding areas, both exclusive and joint use, in the central Brooks Range. And then I have a tabulation of the guides that use the area in the central Brooks from the Dittrich to the head of the Noatak River and it shows the ones that own cabins and/or patented ground, the average number of hunts they conduct per year, the approximate dollar value of these hunts. In answer to your question, there are 13 guides in the central Brooks taking about 8,700 of the guided trips per year and I might point out that this does not include fishing and backpacking and things that are spinoffs of these people being there and having cabins and that type of thing. This is strictly hunting trips and the dollar value amounts to about $363,500. In addition to this, we show about what the cost of average trips are in the area by guide. Also, I picked up the fact that the Frontier Flying Service at Bettles, the major flying service in the Brooks Range, hauls in about 300 to 450 hunters a year into the central Brooks Range and they estimate that the income to them is about $185 per hunter. Now, this would include residents as well as some nonresidents who are flown in by this method. During 1977, Frontier Flying Service flew 1,400 persons into all of the Brooks Range from their base at Bettles and I believe that's the major points.

Mr. GREIST. OK, I'm Burt Greist from NANA Regional Corp. I've been listening to the quality—which I don't really believe is fair.

We've co-existed with the caribou and from the archeological finds, I believe you'll find that an archeological site that has been found where there's traditionally the migration of caribou and also, we utilize about 26 species of mammals—other mammals. We utilize 42 species of birds. We utilize 13 species of fish and about 34 species of plants, making a total of 116 species of mammals, birds, fish, and plants. Since time immemorial, we've subsisted off land. From the Ambler, Shungnak, Kobuk site, there's some people that use the Kobuk River for subsistence uses, hunting, trapping, so on, and so forth, and we'd like to see this subsistence use continued if it were to be included in this park area, Gates of the Arctic, and that's about it.

Mr. QUARLES. Thank you.

Mr. BEVINETTO. In terms of amount of protein taken, can you make a comparison between the marine mammals, fish and terrestrial mammals?

Mr. GREIST. As compared to——

Mr. BEVINETTO. One to the other.

Mr. GREIST. OK, well, there's a study that we've put together a few years back and the Land Use Planning Commission has that study of the tonnage of species of mammals, berries, plants that we use and I'll get it sometime this afternoon. We've also got studies of subsistence use areas that the Land Use Planning Commission does have, and also the Park Service did a study which John mentioned about subsistence, and Doug Anderson put it together. I think you've been familiar with it.

Mr. QUARLES. Yes, we have it.

Mr. GREIST. And we do utilize part of the Gates of the Arctic area.

Renewable Resources

Mr. QUARLES. OK, the next topic is renewable resources: timber, farming, livestock grazing of any kind.

Mr. WICKES. Jim Wickes, Department of Natural Resources. In terms of forestry, our statewide inventory indicates roughly a half million acres with some very low potential. I assume these are all pretty much in the river valleys and the south part of the range. There is no statewide agriculture potential per se within Mr. Andrus' proposed park area.

Mr. QUARLES. Yes?

Mr. GALEA. John Galea, Forest Service. The upper Koyukuk, particularly that portion upriver from Allakaket, was surveyed in 1971; 452,000 acres of forest lands were identified and they included 43,000 acres of forest lands with commercial potential. The standing volume surveyed included 92 million board feet and the annual potential yield is right at 3 million board feet. The annual growth in the upper Koyukuk, when compared to other interior forest lands, rates above average.

Mr. QUARLES. Anyone else on renewable resources? Yes?

Mr. CLIFFORD. I'm Bert Clifford with the Soil Conservation Service and just for the matter of record, we would like to suggest to you that there is about 2.4 million acres of tundra ranges in this proposal as proposed by H.R. 39 that do have capability for reindeer management and also for the——

Mr. QUARLES. Excuse me, that's H.R. 39, not the Andrus proposal.

Mr. CLIFFORD. Yes, I'm using it as the basis as far as this anaylsis. And also, for the committee's edification, if you were so inclined, there is a homestead on Crevass Creek which you've heard and which is right on the boundary proposal. In 1975, the USDA information team went to that homestead and did an information movie by Larry Quinn on, basically, agriculture in the area and I'm not proposing any agriculture in this area whatsoever, but it is illustrative of some of the potential that we talked about.

The area actually 100 miles north is what we really consider ag potential soils. We consider it really kind of a harsh place as far as agricultural soils, somewhat permafrost in nature, so it's not a good one, but some of the things that this particular homesteader—it's Bill, I think it's Crofferty—has been doing as far as cool season plants and hay for his horses—he's a guide there, also—is quite illustrative of some of the things that are a potential in Alaska.

Mr. QUARLES. Thank you. Where's this 2.4 million acres of range located?

Mr. CLIFFORD. I think most of it is the northern aspects that they've been describing. All I'm giving you is the figures that one of our staff people pulled together at an earlier date on this. It's just tundra ranges.

State and Native Land Selections

Mr. QUARLES. In that case, the next topic is non-Federal lands selection, State and Native. I assume the State wishes to go ahead.

Mr. WICKES. Yes, Jim Wickes, Department of Natural Resources. Taking as a base the Andrus proposal of 9.8 million acres, State lands constitute some 1.38 million acres. There is roughly 400,000 acres which—of State selections in the north Koyukuk area which are contested by the Department of the Interior. The State has identified some 400,000 acres of State interest lands which overlap with the Andrus proposal. Most of these are around Walker Lake. Primary interest there is its hard-mineral potential. Of the 13 townships that we have identified to date, we're particularly interested in 2 which abut State lands to the west. The other area which overlaps with the Andrus proposal boundaries is known as the Ambler mine district. That is north of the villages of Kobuk, Shunak, and to the northeast of the village of Ambler in the upper Ambler drainage and its tributaries. Again, the interest there is hard-rock-mineral potential along the line that I'm sure will be discussed in great detail later in the proceedings. This block of land is additionally adjacent to State land. In terms of estimated final Native lands within Mr. Andrus' proposal, the State estimates there will be some 800,000 acres. Thank you.

Mr. QUARLES. Anyone else?

Mr. WILLIAMS. Dave Williams, Doyon, Ltd. We never had any problem with the Gates of the Arctic proposal as it originally came out of the Morton bill. We're becoming concerned. We have very minor land holdings in the area. You can look behind yourself on the map. Right next to the pipeline corridor, there's three townships to the west of the corridor in pink. We do have some prospects in this area and under H.R. 39 and the recent Andrus proposal, these townships, which were never isolated, which actually lay right next to the corridor, now do become isolated townships. Then there are a couple of other townships that also are included within the proposal down further south. I'm certain that the people making the proposals in the agencies aren't intending to obviate our selections in these areas, but I would like to point out that when these boundaries start expanding and contracting that the creation of in-holdings should be kept in mind and, again, what I've been preaching for a week, the need for access.

Mr. QUARLES. Anyone else on selections? Yes?

Mr. SILVER. Does anyone here speak to the dual selection area?

Mr. KAUFFMANN. I will, Mr. Chairman. John Kauffmann, National Park Service. As you may recall, under the previous administration proposal, the Morton proposal, the North Slope area including the entire Killik watershed and portions to the west, including the Kurupa Lake area, were included in (d)(2) status. The Native people of the Arctic Slope Regional Corp., also desired a large part of this area and so the area was put in what is usually called dual withdrawal. In other words, it's withdrawn for Native selection and also for possible park designation with the decision left to Congress. The recent administration proposal, Secretary Andrus' proposal, leaves almost all of this out. This is about a 1-million-acre area in total. The only thing that this proposal asks be left in the park is about 20,000 acres around Kurupa Lake because that is a key access point to extremely significant resource up in that part of the park proposal area. However, under the Andrus proposal, the Regional Corp., would have subsurface rights where they're going to directional drill. The other area that would remain in public ownership under the proposal is the Killik River itself as a proposed wild river. I believe the acreage total there is 152,000 acres. There again, under the Andrus proposal, the Regional Corp., would have subsurface rights. The rest of the area is not in the proposal as it now stands. this is the administration's proposal. There are other proposals which do include this territory.

MR. QUARLES. Just one question, if I may. When you say subsurface rights, are you contemplating slant drilling or will they have the ability to put the rigs in the area?

Mr. KAUFFMANN. I believe it is directional slant drilling only.

Energy Resources

Mr. QUARLES. Anyone else on land selections? Well, that last discussion is a good introduction to energy resources.

Mr. HARTMAN. I'm Don Hartman with the Alaska Oil and Gas Association. The northern part of the park proposal plus the proposed Killik wild river and perhaps the Anaktuvuk wild river do encroach on the sedimentary basins of the Arctic slope. The northernmost portion that is effected by these proposals is the northern foothills province between the Colville River and the mountain front just a short distance south of the Colville River. This is an area of gentle, rolling hills that geologically is underlain by a series of extensive anticlinal folds that are very prospective for oil and gas. There is active exploration in this area. In the past 2 years, three wells have been drilled in this province, either within the park proposal or adjacent to it, and there is one testing drill at this time on the Anaktuvuk River, just within the park proposal. One of these wells that was drilled in the past 2 years did obtain some significant commercial production of natural gas.

To the south of the northern foothills is what we call the southern foothills or the disturbed belt, which is the range of relatively higher hills isolated by lower areas in front of the main Brooks Range. Geologically, this area is underlain by fifteen to twenty thousand feet of prospective sedimentary sections of a lower Mesozoic to Paleozoic age and there are a number of very attractive anticlinal and fault structures here. There's a series of thrust faults that create very prospective along this whole belt and in addition, there is a part of a long outcrop section of medium to fairly rich oil shale. The outcrop is in a narrow belt for a few hundred miles across this slope. As I mentioned, there is a well being drilled on the Anaktuvuk River at this time. This will be our first test in this part of the Arctic basin in this disturbed belt.

Now, the Brooks Range is the Alaskan extension of the Rocky Mountain province and I'd like you to note that in the disturbed belt of the Rocky Mountains in Canada and in Northern United States, this is a very prospective region for oil and gas. In the past 2 years, there's been a very extensive exploration program with many important discoveries in the disturbed belt, so we believe that there should be afforded access to this area in the Alaskan Arctic and also that consideration should be given to options for choosing road routes and pipeline routes. South of this disturbed belt, in the same Brooks Range itself, the northern part of the Brooks Range does also contain many thousands of feet of prospective rocks which may bear oil and gas. The sections to the north, but I should point out, too, that it's completely unexplored. The only exploration that's been done within the range is strictly geological or by remote sensing geophysical means. And again, we feel that access and movement on these lands for exploration and production should be maintained.

Mr. QUARLES. Does anyone else wish to speak to energy resources? Yes?

Mr. MULL. Yes, I'm Gil Mull, USGS. I personally have done a lot of surface geologic mapping along this entire Brooks Range front. I have a few personal comments on that in a moment. In 1975, the resource appraisal group of the branch of oil and gas resources did a survey and a regional assessment of all of the United States, assessing the undiscovered recoverable resources, making an estimate for various subsections of northern Alaska, one of which is what they characterized as the southern foothills of the Brooks Range subprovince. This would roughly coincide to the disturbed belt and mountain front area that Mr. Hartman was just referring to. Their assessment for the entire Brooks Range belt—now, this is from the east end to the west end in this disturbed belt or the foothills—excuse me, the mountain front—suggested that there was a probably 95-percent chance there's nothing there, but on the 5-percent chance on the upper range there might be as much as 1.2 billion barrels of oil. Their most likely assesssment suggested perhaps a 300 million for this entire belt in total.

Now, for prospective, this same group assessing the potential of the Arctic coastal plain area for all of northern Alaska suggested that there was probably a 95-percent chance there might be as much as 3 billion barrels and 5-percent chance that there might be as much as 10 billion barrels of oil for the Arctic coastal plain and I mention these figures just for perspective to show the general range of interest. For the disturbed belt and the mountain front areas, the resource appraisal group suggested for gas that there was perhaps a 95-percent chance that there might be as much as 7 trillion cubic feet of gas in this belt, a 5-percent chance that there might be as much as 25 trillion cubic feet, and perhaps the most likely of 18.5 trillion cubic feet. Excuse me, I'm terribly sorry. I just read you the figures for the Arctic coastal plain. On gas, for the southern foothills and Brooks Range mountain front, they suggested there's a 95-percent chance of zero gas, a 5-percent chance there might be as much as 7 trillion cubic feet, and a most like of 2.27 trillion. So again, for perspective, in the Arctic coastal plain area, they suggested a 90-percent chance of 7 trillion, a 5-percent chance of 25 trillion cubic feet of gas. And again, for a little bit of perspective on it, Prudhoe Bay has roughly 9.6 billion barrels and 26 trillion cubic feet of gas.

The gist of this is that on a relative rating, we would have to say that the southern foothills, the disturbed belt, and the mountain front area is substantially less prospective than the coastal plain areas by a large magnitude. As Mr. Hartman commented, this portion of the Brooks Range is considered to be a northern extension of the overthrust belt that runs from the Rockies through Canada. In a comparable sort of position in Canada in the Alberta foothills, the Canadian resource appraisal people tell me that perhaps 20-percent of Canada's natural gas comes out of this belt. So again, if this analogy holds in northern Alaska with the Canadian analogy, if that analogy is actually valid, there could be a substantial resource base.

Again, this gets into some factors. The area is rather imperfectly known, but based, again, on some on the personal experience, just based on surface geology, it would appear to me that the structural relationships in this portion of the Brooks Range are substantially more complex than in the Canadian and I personally would suggest that the resource range would be toward the lower end of the estimates of the resource appraisal group made in 1975.

I think one of the very important things that should be considered well is indeed this matter of access that a number of people have commented on. In this game of exploration for resources, access to areas for scientific purposes—just for information—is very necessary. The game of unravelling the details of the geology, I'd liken to something like solving a murder mystery. You may have to wander over many hundreds of miles picking up clues that may point to a localized area that is 300 miles distant from where you actually stand at this point, but it becomes very necessary to have access to these areas to pick up these clues that may point to an area that is actually, in fact, on the coastal plain.

Mr. QUARLES. Gil, just a minute. When you talk about access, again, are you talking about just collecting surface samples or actual——

Mr. MULL. Surface samples——

Mr. QUARLES. [continuing]. Core drilling?

Mr. MULL. Perhaps core drilling, perhaps even seismic work. But all of these are scientific studies. Now, I feel we should expand that even further and in my portion of the game, of course, you have to look at rocks. But other disciplines, whether it's botanical or wildlife, also need access and sometimes by aircraft or helicopter to these remote areas. So I think the access—the ability to enter into these areas for certain purposes needs to be considered.

Mr. SILVER. Gil, do you have a most likely range in this disturbed belt for oil and gas? You gave a 95 percent and a 5 percent. Is there something in between?

Mr. MULL. Yes, the most likely in the disturbed belt foothills?

Mr. SILVER. Yes.

Mr. MULL. The most likely for oil is suggested as 300 million. For gas, the mostly likely is 2.27 trillion.

Mr. SILVER. Thank you.

Mr. QUARLES. Anyone else on energy resources? Yes.

Mr. WICKES. I'll just toss out some statistics. Jim Wickes, Department of Natural Resources. The overlap of the Andrus Gates of the Arctic proposal with this overthrust belt that's been talked about fairly extensively comes to about 820,000 acres which rank in the third and fourth levels on our scale of 10.

Nonfuel Mineral Resources

Mr. QUARLES. Anyone else? OK, we move on the nonfuel mineral resources.

MR. HEATWALL. I'm Dave Heatwall of the Alaska Miners Association. I'd like to get some maps put up before I start and while those are being put up, I'd like to pass up an assessment of minerals here that we've been talking about. This comes from a prospect located about 3 miles from the western boundary of the park. Its a high-grade copper, lead zinc, silver sample. I'll pass that up for you to look at.

This will be kind of an illustrated talk and I've asked Tom Crafford up there to point out the various areas as I talk about them, so there'll be a little action going on behind you there. I'm an exploration geologist employed by the Anaconda Co. I've spent the past 4 years working in the southwestern Brooks Range, principally in the Ambler mining district. This is located west of the park proposal. During my talk today, I want to comment on the mineral potential that industry recognizes in the Gates of the Arctic park and also bring to your attention how the various park proposals inhibit the development of the known mineral deposits of the Ambler district.

In discussing the mineral potential, I would like you to refer to the map which is posted up there. The park boundary is illustrated by the heavy black line. This is based on the administration's proposal. The first thing I would ask you to note is the numerous red dots denoting important mineral prospects which are clustered just outside of the southern boundary of the park proposal. Now, the lack of prospects inside the park is due to the fact that industry will not prospect an area where it cannot obtain the mineral rights. Because the (d)(2) lands of the park proposal have been closed to entry, no prospecting has taken place. Hence, there have been no discoveries, so the fact that only a few important prospects are found inside the park proposal does not mean it contains no mineral potential. It simply means it has not been prospected.

Now, I'd like to comment specifically on some of the identified prospects. They're numbered up there. Tom will point them out as I talk about them. Prospect No. 25 is a high-grade, copper, lead, zinc silver deposit where five drill holes have defined several million tons of mineralization with values up to $110 a ton. The geology suggests that significant additional reserves will be found. Prospect 26, known as Bornite, is a very high grade copper deposit. Numerous drill holes have defined several hundreds of thousands of tons of high-grade copper worth approximately $120 a ton and millions of tons of lower-grade copper. Prospect No. 27, known as the Arctic deposit, is one of the world's largest copper, lead, zinc, silver ore bodies. Numerous diamond drill holes have defined 40 million tons which average 4 percent copper, 1 percent lead, 5.5 percent zinc, and 1.5 per ton of silver.

Prospect No. 28, known as the Sun Picnic Creek area, is a major copper, lead, zinc, silver occurrence where seventeen drill holes have defined over 1 billion dollars' worth of metal. This deposit is surrounded by the proposed park and is less than 6 miles from the park boundary. Now, I noticed on the map that was up there earlier that the actual park boundary is only about 2 miles from the Picnic Creek site, it must be under the House Resolution 39 proposal. Now, the other red dots in the so-called Ambler district represent important base metal occurrences. This district already has larger reserves than numerous producing districts of the lower 48.

I'd like to comment on some smaller prospects which have not been drilled. Prospect 29 are geochemical anomolies in rocks that are similar to those of the Ambler district. The (d)(2) lands status has prevented their testing by drilling. Prospect No. 30, up all by itself there, is a skarn deposit where assays of 1-percent tungsten and tin have been found. Prospect 31 is geochemical anomolies in—gossans in rocks similar to the Ambler district. My company plans to drill a hole to prospect one of these during 1978. Prospects 32, 33, 34, and 36 are copper, lead, zinc, silver occurrences in sedimentary rocks. Grades up to 20 percent lead zinc and 3 percent copper have been recorded. Again, the uncertain land status is preventing the testing by drilling. Prospects 35 and 37 are placer gold occurrences which have had significant past production. Prospect 39 is a porphery copper occurrence containing small skarn deposits grading up to several percent copper and prospect 40 is a high-grade copper zinc occurrence with values up to 10 percent copper, 10 percent zinc.

Now, geologically, all of these prospects occur in a belt of favorable rocks which extends across the southern end of the proposed park which is indicated by the yellow lines on the map. It is my belief that important metal deposits exist within this zone and if exploration is allowed, the area will become an important source of domestic metals production. I might point out that that yellow strip corresponds to the brown which has been defined by the U.S. Geological Survey in their work in the area on their map on the wall.

Now, across the northern boundary of the park, a belt of Paleozoic and sedimentary rocks has excellent potential for the occurrence of copper, lead, zinc, silver deposits. The mineral potential of these rocks was recognized after the (d)(2) withdrawal and no prospects have been identified due to lack of exploration activity. Major lead and zinc silver deposits have been found in similar rocks west and east of the park proposal. You've been informed of these or will be informed of these another time. I'd like to point out that the most dramatic scenic resource of the park proposal, the Arrigetch Peaks, they're in spot 30 up there, lies outside of these two important mineral zones.

Now, I would like to also call the committee's attention to how the various park proposals lock up the Ambler district, the largest known mineral resource in Alaska. The gross metal value of the known mineral deposits of the Ambler district at current metal prices is $6.3 billion. This is a crude reserve based on drill intercepts. There's no speculation in it. I figured this dollar value last Friday at current metal prices, which are depressed at this time.

None of the deposits have been completely tested by drilling and additional values will surely be found in the known deposits and we predict additional discoveries will be made in this district. Because the deposits of the Ambler district were known at the time of the (d)(2) withdrawals, they were omitted from the proposed park boundaries. However, the planned park would have cut off all the natural access corridors to the mineral deposits and completely isolated them from Alaska's transportation system.

During 1977, my company hired a group of independent consultants to study the feasibility of mining in the Ambler district. This group studied all possible means of transporting minerals out of the area—including roads, barges, railroads, and air freight. Their recommendation was that the most economical system out of the area was a road to the east, connecting with the Alyeska Pipeline Haul Road. Less desirable surface access would be to the west to Kotzebue or the Golovnia Bay area of the southern Seward Peninsula. The map shows the relation of these transportation corridors to the park proposal. If access corridors are not guaranteed in the (d)(2) legislation, the nationally important mineral deposits of the Ambler district most likely will not be developed. This will cost the Alaskan economy approximately 1,800 year-round jobs at the mine sites. This is based on our feasibility study. Several thousands of support jobs, millions of dollars in support expenditures, and the State of Alaska would be denied a significant income via the mining license tax. It is certainly in the best interest of Alaska that the U.S. balance payments to assure access to corridors to these deposits. That concludes my statement.

Mr. QUARLES. OK. Does anyone else wish to speak?

Mr. GRYBECK. Donald Grybeck, U.S. Geological Survey. I'd like to talk about that map on the wall up there. It's the one I referred to previously and I'd like to discuss the regional implications of mineral resources in the area. Starting at the top of the area, I don't have the Gates of the Arctic boundary outlined there, but at the top of the area, there is phosphate resources in a band across the northern part of the area. I talked to these previously. Referring to something Dave said, these rocks do have a similar age rocks to the west have—the work has become available in about the last year—seemingly have a very high potential for lead zinc deposits, but at least tying that map to the area, didn't have any information. Coming to the south somewhat, there's some red areas around the Arrigetch Peaks. The same process has formed the very spectacular scenery of the Igikpak and Arrigetch area—formed a number of mineralizations and geochemical anomalies around these intrusives. Mineralization is chiefly a border of these intrusives. It's probably very narrow. A great variety of minerals. Dave mentioned tungsten, zinc, lead, tin may be very important in these things. There is no major deposit known. There's quite a number of finds of this type of mineralization. The work that's been done so far is very preliminary. Shifting to the Mount Doonerak area over there, which is lake ground, there is some indication of massive sulfide mineralization and some either volcogenic or syngenetic lead, zinc mineralization in the Hunt Fork. Again, this is very largely untested.

In the light green area there, which is somewhat east of the Arrigetch, Mount Igikpak—that's mainly on State land. That's scattered copper occurrences. There's some occurrences of shale and there's some gold placers in there. I'll pass the copper belt up for a moment. There's a sort of orange-brown area, quite extensive in there, south of the Copper Belt. It does make up part of the Gates of the Arctic area and that's rather speculative. It's a possible area of uranium mineralization in the really unknown possible Tertiary sediments in those basins out there. These I'll refer to later when we talk about the Selawik area. There is quite an extensive area of hard rock—granite, uranium mineralization in the Purcell Mountains, Selawik Hills. They would furnish a very nice source for sedimentary uranium out there. There are no holes out in those basins. There is no known occurrence—strictly geology. By far the most interesting, the largest mineral deposit probably of concern in that area is that brown belt right along the south side of the Brooks Range and I've shown it all the way from almost Kiana to the Chandalar area.

Now, for the purpose of making estimates, I've divided that in thirds. The center third is the area that Mr. Heatwall has been talking about in some detail. It is the area that's known best. We've referred to level II, III, whatever, as our survey work. We have some level III work in there, but industry has done a great deal of work. That area is the one that's best known. We've estimated the number of deposits in that area and we'll say there's a 90-percent chance that there's at least 15 major deposits in there. There's a 50-percent chance that there's 20. There's a 10-percent change there's 30. Already, the Arctic deposit is in the very high end of that curve as far as tonnage and grade. It is truly a world-class deposit. There's no two ways about it.

I might also remark on something else that applies to finding these deposits, effectively locating them, how they're going to affect land planning—they are extremely subtle deposits, extremely so. I know at least two geologists who walked across Arctic camp and didn't think it was worthwhile to take a sample of it. They're relatively high grade and small. For instance, the Arctic deposit is less than 150 acres in size.

Now, as I say, I've divided the belt into thirds. There's a third to the east, there's a third to the west. We estimate they have basically the same number of deposits. The amount of data we have to make that estimation, however, is very, very low. There is very little work on those areas and especially by industry. Effectively, the area to the west extending over the Hub Mountain area—almost no work by industry and very little work by us. There is somewhat more work in the third to the east, but, again, it's relatively poor compared to that central third. Now, that concludes my testimony.

Mr. QUARLES. Thank you. Yes?

Mr. FANKHAUSER. Bob Fankhauser, Alaska Miners and I'd like to approach the board there for a few short comments in reference to that larger map, if I may.

Mr. QUARLES. Certainly.

Mr. FANKHAUSER. Thank you. I'll use this map here showing you outlines of environmental concern. I can't really address the area very well from the other map because of all the overlays, but I would like to add a couple points on this schist belt and also a little bit on the carbonate terrain to the north from having worked in the area from industry.

I spent a couple summers over here and I can add a little bit more information on the eastern third of this schist belt and particularly areas to the north that were mentioned. The areas from Iniakuk Lake here northeast toward Wild Lake and over to the area of Wiseman is areas prospective for massive sulfide deposits in the schist belt and in this low portion of open land in here, we drilled two major prospects last year which I found significant mineralization. I won't go any further than that, but these, again, substantiate the continuation of this massive sulfide, lead, zinc belt that was mentioned earlier—copper, lead, zinc. I might mention also that just to the north of this schist belt which is separated by a major fault is the carbonate terrain which is also prospective for both Mississippi Valley and Sabkha type lead, zinc deposits. This is a largely unexplored area because most of it falls into the (d)(2) lands but from work to the east and from just to the margins of open ground, we've found significant occurrences that would indicate that the area just southeast of Doonerak and in this area here in the upper Allen River, Wild Lake area, have considerable potential for this type of deposit. One of the things that makes the Doonerak area particularly interesting is its large anticlinal surface whereby the older rocks are * * *, shales and some volcanic units of analcites and so forth that have highly geochemical lead-zinc anomalies coming from them. They also have in place massive sulfides of lead, zinc over here on the eastern part of the area, as I say, just to the part that is open, but the important thing is that the younger Devonian and Mississippian rocks are turned up on this anticlinal edge and it's in these rocks that the Devonian Limestone and the Mississippian Hunt Fork Shale and the overlying

Lisburne Limestone that have recorded occurrences and highly prospective geologic potential for these carbonate and shale-hosted rocks.

Now, I can't point out very much details in here because this area has been withdrawn prior to the recognition in this area of the strataform potential of these deposits, but there are occurrences in the upper Ernie Lake area in the carbonates that are solidified that contain lead zinc. Also, in the upper 60-mile drainages over here, there's lead-zinc deposits in the carbonates. Around Wild Lakes, there's copper, a form of chalcocite in the shales and dolomites of that area and, of course, the gold mining around Nolan and Wiseman area has been known for sometime, but I would like the Commission to realize that this area just to the north of the schist belt does contain massive sulfides and carbonate and shale-hosted terrain and if given the chance, I'm sure we would see the same kind of mineralization as in the schist belt to the margin.

I would also ask the permission in view of these major belts streaming across the Brooks Range that access corridors as mentioned before from the Arctic district over here—the logical choice would be to the east whereby this sort of subsidiary type deposits could be incorporated without major amounts of environmental damage or extensive additional roadbuilding. Thank you.

Mr. QUARLES. Anyone else on mineral resources?

Mr. CHADWICK. I'm Russell Chadwick, consultant for the Park Service, and I did one of the mineral appraisals in the then Gates of the Arctic proposal in 1976. I believe Park Service has submitted reports so that it isn't necessary to go into details. Perhaps I can briefly sketch things.

The appraisal, as the committee also knows, was geared toward an estimate of the market value with its special definition and the proposal and the study involved some 28 groups of claims. However, on this map, most of them have been by now eliminated by the alteration of the boundaries. The original boundary in the area of the Kalurivik Arch and the belt that everyone has been speaking about—the boundary was designed to eliminate most of that known mineralized area and I see from this proposal that it's been modified further so that in actuality, the bulk of the properties which were the presumably existing, valid mining claims within the boundaries have now been eliminated, but since there's the possibility of change, I might just run through them briefly anyway.

Of the 28 original properties, only 10 were found to be still persisting. A lot of them were dropped in 1976, as always happens, and most of the claim groups initiated because of geochemical anomalies in the area and then once there had been on the ground geologic inspections, these properties weren't found to have apparently any visible attraction to the owners and they were dropped. So that there were 10 left and, of those 10, 7 of them were on the north flank of the Kalurivik Arch within one township there, 22 north, 10 east. And now that has been presumably eliminated. But at the time, they all had merit because of the pattern of exploration on the Kalurivik arch or that belt that extended through here—the schist belt, in other words. They all had the distinctive characteristics which made them attractive to exploration, that is, they had the sequence of metavolcanics with the sediments, some basic along the volcanics, and by and large, schist was then also an attractive part of what—they're called a package. They all, with the exception of one, exhibited some gossans, the iron capping that is characteristic of the massive sulphite deposit and they all were very high geochemically, both in stream sediment analyses that lead to their being staked and also on the ground. So all of those prospects had definite visual merit and met the criteria of explorations up there. Only two of them had preliminary drilling in them and those had exhibited commercial mineralization or very attractive oxidized mineralization. And in all cases, they are those same groups persisting. They still remain valid prospects in the area. The sum total of the market value at the time was on the order of about $0.5 million.

There were three other prospects of the ten. Seven of them were in the one township. One was to the north on Laniak Creek. It was a slightly different type of deposit. It was in a very preliminary stage. It was a good geochemical anomaly and on the ground, one could see the disseminated mineralization. However, it looked to me like it was in hornfels and it was a different type of mineralization from that on the arch. So that was eight of the deposits which were found to have some market value. The other two were over here with placer deposits on Mascot Creek and on Washington Creek in the Wiseman district and one of those is currently under operation and was producing at the expected rate. It was a good little property. The other was a prospect known from the literature and has been described in the literature as having some merit. These, however, being placer deposits and small operations were estimated to have a market value of about $75,000.

Mr. QUARLES. Anyone else wish to speak?

Mr. HEATWALL. Can I make a comment? Dave Heatwall, Alaska Miners. Russ, would you clarify the deposits you're talking about in the Ambler district are not the same that I referred to with my $6.3 billion and your $500 million? I think there's a confusion there.

Mr. CHADWICK. Well, in order to get some background for my appraisal of the prospects, why, I, of course, went through the existing known deposits along the belt, including Arctic and Picnic Creek and the other better known prospects, older prospects in the area and saw these for comparative purposes and all of the companies cooperated in making the general geology of the area clear and in providing data on their own deposits and I've seen those and, of course, the figures have been published and I don't think there's——

Mr. HEATWALL. OK, I just wanted to clarify that we were talking about two separate deposits.

Mr. QUARLES. Anyone else?

Mr. MOWATT. Tom Mowatt, Bureau of Mines. I think we should make clear the difference in a mineral resource assessment between a recitation of known prospects and a more thorough evaluation of geologic relationships in the context of what they may represent. We have to emphasize that the present level of geologic knowledge throughout most of Alaska is generally quite inadequate to permit full mineral resource assessments. This is particularly true for most of northern Alaska.

The western Brooks Range has been suggested as containing potentially one of the most significant metallogenic provinces in Alaska, perhaps in all of North America. This is based on the work by industry and the Geological Survey in the Ambler District.

The belt of lead-zinc-borite deposits and the deposits in the granitic terrane in our estimation also represent yet other relatively unscratched areas of mineral potential that merit further study.

Mr. QUARLES. Bob.

Mr. KLINE. Bob Kline from the Department of Natural Resources. From a statewide perspective, the Andrus proposal includes about 9.8 million acres. According to our August 1977 assessment, about 9.3 million of those acres have hardrock mineral potential. Additionally, the top 30 percent of our assessment contains about 4 million acres, so it's a very significant area for hardrock potential. Additionally, I'd just like to say that, probably, the Brooks Range as a whole—on a national basis—is probably one of the more significant unexplored areas with high potential for hardrock minerals in the country. Thank you.

Mr. QUARLES. Yes, John.

Mr. KAUFFMANN. John Kauffmann, National Park Service. I think it's interesting to note that the claims that Mr. Chadwick mentioned as having been dropped are in, I believe, the upper Kogoluktuk Valley, which is one of the most beautiful valleys in the western part of that area. Mr. Chairman, I'd like to submit for the record a little sketch map showing the townships in which valid mining claims exist today. It's interesting to note that in the proposal you see there, two-thirds of the claims that are within the boundary, roughly, are on State selected land and therefore one would assume it would remain the State's decision as to whether the mineral exploration and development went forward. The other third—or most of them—are on (d)(1) land over on the north fork of the Koyukuk River, which has been (d)(1) with, I believe, a State selection assertion on top. It's been open to exploration. There have not been many claims, comparatively speaking, staked there. I believe, and Mr. Chadwick can correct me if I'm wrong, but the majority of the new claims over there have been gold-related claims and there's some old gold claims over there, but this map, which I'd like to submit, will show you where the State land and the mineral claims coincide.

Mr. QUARLES. Anyone else on minerals? Yes?

Mr. DYLAN. John Dylan, State division of geological and geophysical survey. We studied the Wiseman area which is an eastern State selected block above the word "Gates" on that map behind you and we found it to be abnormally high in mineral occurrences. We found all but geological indications of the schist belt that occur with known deposits over in the Ambler district, and finally, we found it to be most potentially favorable from our reconnaissance work in the southwestern portion near the Imiakuk and Middle Fork Creek area and since the boundary there is close to those occurrences, we'd like you to be aware of them.

Mr. QUARLES. Anyone else?

Mr. KLINE. Bob Kline of DNR. I just want to point out very quickly that of the 4 million acres in the top 30 percent, the State would own about 1 million of those acres.

Transportation and Access

Mr. QUARLES. All right. The last topic is transportation/access values. We've had already some discussion of that. Does anyone have anything to add? Yes.

Mr. THOMAS. Yes; Bob Thomas with the State Department of Transportation and I'd like to put something on the board, speak at that for a few minutes. Mr. Chairman, I'd like to speak on the transportation corridors extending west of the Haul Road into the Seward Peninsula area and also the corridor running up tying into communities along the west coast. Because I'm speaking of transportation issues, it's necessary to talk about corridors and it's very difficult to break them up into the (d)(2) areas and I think if I make one presentation now, it will pretty well wind it up for the entire region. The areas we're talking about, these particular corridors would either go across or become quite close adjacent to either Kanuti National Wildlife Refuge, the Gates of the Arctic National Park, the Selawik National Wildlife Refuge, the Bering Land Bridge, the Kobuk Valley National Park, and the Noatak National Ecological Preserve, plus various wild and scenic river proposals, and also the possibility of the Cape Krusenstern National Monument.

For a few minutes here, I'd like to refer to what I call the fuel budget between here and Nome. I've shown this once before here, but I'd like to make some more specific comments on it right now. This is a chart showing the amount of fuel used by the mode of either air or by truck. I'd like to point out that approximately 260,000 tons if you haul it by air. It would use approximately the the same amount of fuel if you hauled it by truck. I'd also like to point out that would be approximately 40 million gallons of fuel used and I'd like to point out that about 90 percent of that, using the truck or surface load, would be used to construct a facility that could be used after the 260,000 tons had been hauled out. If you hauled it all by aircraft, that entire amount of fuel would have been turned into smoke and you couldn't use it again.

What this boils down to is that truck highways are roughly 10 times more efficient from a fuel conservation standpoint than aircraft. The railroad is approximately 8 tons more efficient than that, so it's important that we think of surface transportation corridors. I think I'll go back to my seat and finish this. I discussed that while I was up there from an energy standpoint. Now I'd like to discuss it from an economic standpoint. Currently, people in western Alaska have reached their upper limit on their ability to pay for their transportation needs and that's even though the costs are pretty much underwritten by the U.S. Government. As somebody pointed out, these people who live out there—these residents have some of the lowest incomes for people within the State and yet, right now they depend upon the highest cost mode. There are also some seasonal restrictions. Shallow seas make it very difficult for boats to come in close to shore. The ice in the winter time, most of the time of the year, the ice is thick and the ships can't go in there and as you get progressively north, this becomes more and more of a restriction. The communities themselves are very small in population and therefore, they don't demand or can't command a ship of large size and plus it's difficult for these people with low incomes to stock in inventory from an economical standpoint. Also, the current transportation system is based and depends upon pretty much economic and political. It's not something that's stable. Just depending upon going with the country. It's outdated with the exception of the political and economic factors that are cranked into it and, as you know, this can cause changes overnight and I think a good example of this is the restriction of hauling flammable material in aircraft.

Several years ago, it was quite possible to haul fuel oil pretty much all over Alaska. Now, some communities up there who depend upon hauling fuel oil—it's on a year-to-year basis and just very difficult. So these political factors can change overnight and cause a need for a transportation system overnight. These are immediate problems and these problems must be addressed by the State. We're responsible to provide transportation for citizens.

I'd like to point out some of the things that the Native Settlement Act did. It put a lot of the land into what will be a development status and this will cause some access demands which the State will have to take a look at. It also took a lot of land out of Federal status and that decreased the State matching funds for our highway program. Presently, our matching fund is about 5 percent and this amounts to approximately—average over a number of years—of about $5 million per year. It has been estimated that because of the loss of Federal ownership that the matching funds would be increased to 15 percent—20 percent, not 15 percent—or a 15-percent—or a three-time increase. In other words, we would be paying $20 dollars instead of $5 million to match our highway funding. This is $15 million per year in excess that we currently have. Also, under the claims, there is not too much of a chance to tax these lands for the first 10 years. Now, if you take $15 million per year and multiply it by just 10 years, that's $150 million the State is going to have to come up with in excess of what it does now. If you take that for 20 years, then we're talking about $300 million.

As we've heard this morning off and on, the mining industry's going to need access into this area here and so the State must be responsible and respond to all these needs for access and it's been proved in my mind that the State together with the mineral industry and the Native groups—that we join hands and we deal with these problems and that we face the future ones because I think that only by working together can we resolve all of our problems. I would even suggest that the Federal Government help us out by considering an extension of the Alaska Railroad into this area here.

The present status of the corridor from the Haul Road to the west—we're in a very intensive study defining it and looking at the environmental problems on it. This corridor follows along basically the lower limits of the Gates of the Arctic Park for much of the way and it's been suggested that we slide this corridor even further south. We get into wetlands when we do and then there's a new regulation. Flatlands are subject to the same strenuous stipulation that parklands are. Also, one of our original corridors that went up towards Barrow did cross right through the—I believe it was the Noatak or Kobuk Reserve. We have since realined that corridor to go along the coast to serve the communities better. The corridor would also provide access to the park. For family outings, this is important. For hiking and for other things. If the park is for the people, then I believe it should have reasonable access. I think somebody mentioned that it costs about $1,400 to take a family of five for a float trip and that wasn't very much money. I think that's a lot like the statistician who stuck his feet in a bucket of ice and his head in the oven and said, "On the average, I feel just fine."

There are other reasons that access is important. There are people who come up here for a once in a lifetime trip. They can't afford an extra $1,400 to go and see this part of the country. There are old people who just can't stand that extensive trip and retired people and this kind of thing. Therefore, by not providing access, you're restricting your visitors to young, healthy, and wealthy, and I still maintain that taking pictures doesn't wear the country out.

Another reason we haven't pursued a road or a railroad in this part of the country is that the State just doesn't have the money at this time.

I'd like to discuss a little bit of the effect of the corridor on subsistence hunting and fishing and lifestyle. First of all, the corridor can be designed to create natural barriers to keep people out of small communities and I think a very good example of that is the community of Tetlin. Tetlin is less than 20 miles from the highway and yet those who have been into Tetlin know it's a pristine community and it's only 20 miles from a major Alaska Highway and therefore it hasn't been effected. You put access into there and it probably would be effected but it only takes a 20-mile barrier if there's proper natural barriers involved. Also, the further away you get from a population center, the less and less the effect is. I think the community of Hope which is off the Seward Highway is an example of that. It has road connection and yet hasn't been effected to a great degree. There are also such things as regulations that can be imposed. I think the regulations on the Haul Road have demonstrated that that's all it really takes. Restrict hunting from the proximity of the road, fishing, and also your all-terrain vehicles on there. There are other ways of controlling people rather than by keeping them out of the country.

In closing, I'd like to state that both this corridor and the one to the Seward Peninsula and also the corridor to Bethel are of absolutely—necessary if the State is to effectively carry out its responsibilities to meet the transportation needs of the citizens.

Mr. QUARLES. How much of this presentation you've given, is based on the assumption that the Haul Road will open?

Mr. THOMAS. I don't think any of it is based on the assumption that the park—or the access road will open except it's based on the fact that it won't be closed or won't be ripped up.

Mr. QUARLES. So the park access would then come from the west if the Haul Road doesn't open?

Mr. THOMAS. No, I think if the Haul Road is closed, it would be closed north of the intersection. Access to the west would tie up.

Mr. KLINE. It might be a point here just to restate the State administration's policy on access and that is that the administration is vitally interested in providing some kind of mechanism within this (d)(2) legislation for access, but that it doesn't feel that any particular corridor should be identified at this time or in the legislation. I want to make that clear.

Mr. QUARLES. Anyone else?

Mr. KAUFFMANN. John Kauffmann, Park Service. A Department of the Interior spokesman or several will address the matter of corridors later in the day, Mr. Chairman, in the context of some of the other areas we will be looking at, but those discussions will be applicable to the Gates of the Arctic area.

Mr. QUARLES. Fine.

Mr. KAUFFMANN. For the moment, I'd like to just take a minute to discuss recreational access and some of the ramifications of it. This central Brooks Range area, although it's rugged, is very traversible country. It's not formidable. Except for the high ridges and the crags, one can go pretty much where his energies and will will take him. There are many lakes into which you can fly and from which you can depart on a variety of routes. The use has been light in the past. It's building up quite remarkably in recreational use of the area.

Now, it has been frequently alleged that areas such as this are useful to the young, the vigorous, the leisured and the affluent, but we're finding that this is not necessarily a correct assumption. The country can be fully enjoyed by any able-bodied person between the ages of 12 and the midsixties. We made some informal contacts with more than 100 Brooks Range recreationists in 1976 and found that 25 percent of them were over 40 years of age and 10 percent were over 50.

A Brooks Range experience can be fitted into a standard 2-week or 3-week vacation. The cost, as Mr. Mills has pointed out, are comparable to other types of vacationing of similar high quality and I think it may be interesting for economists to research some of the hidden costs of other kinds of access where the cost of equipment and maintenance are very high. We found that the cost of a Brooks Range trip is under about $200 a week, which would be probably similar to what you would spend at a developed area, maybe less. What's confusing is the high lump sum cost of access, but this is offset by a very low cost of living per day after you get into the country. It seems that a number of people are going into this country and all over Alaska not because of affluence but as a result of thrift and choice in how they budget their financial resources. They are buying experiences rather than hard goods so that some new piece of equipment foregone is a wilderness trip earned or gained.

Those contacts we made with recreationists—it's interesting to note—included not only the expected numbers of students and professional people who might be presumed to have free time and be comparably affluent, but it included a bank clerk, an auto salesman, a bartender, busdriver, 3 firefighters, 4 housewives, 3 laborers, a plumber, 12 teachers and 3 truckdrivers. In closing, I'd like to quote a sentence from a letter I just received from a college student in Pennsylvania, asking about Alaska. She wrote, "I will be working very hard this summer in a bakery to enable me to travel there and stay for as long as I can." Thank you.

Mr. QUARLES. Anyone else?

Mr. GREIST. I'd like to basically reiterate what the NANA Regional corporation has testified during hearings about the corridors, the proposed coal slurry lines, oil and gas pipelines, so on and so forth, as it relates to that area west of the proposed Gates of the Arctic. We've opposed any east-west lines, because of the fact that it's obvious that it'll stop caribou migrations and practically wipe out one of the last largest remaining caribou herds in North America. Also, you'll note that the proposed route of the highway, oil and gas line is all on the northern part of the Kobuk River as it passes through the Kobuk River and into Noatak area. The northern tributaries of the Kobuk and Noatak River are the salmon spawning rivers. In case there would be interruptions of some type or disruptions, that would practically kill the subsistence resources that people use up there.

Mr. QUARLES. All right? Yes?

Mr. WETZEL. Dan Wetzel, Alaska Professional Hunters. Pardon me, Mr. Chairman, I missed a chance to speak on the wildlife economics. I'd like to make a couple of comments.

Mr. QUARLES. If you could make them brief, please.

Mr. WETZEL. The objection of many people to the Gates of the Arctic National Park and others is simple. It's size. As a member of many and major groups that belong to the Alaska Coalition, I can support a park in the Gates of the Arctic in the Brooks Range, but I can't support one of that size nor one that's based on arbitrary and capricious boundaries and not based on true ecosystems. It's a good thing that Bob Marshall never walked up the Middle Fork to Chandalar, or I'm sure that would be included there, too.

I'd like to speak to hunting in dollars and cents of hunting. Dollars and cents of recreational values. I think that many of the values that are premised in Gates of the Arctic National Park have obfuscated the value of hunting and the compatability of hunting with these other values. Now, the only renewable resource that's going to maintain itself in an area like this is primarily recreational, which is sport hunting and which is hiking. My hunters—when we go hunting—pay an average of $2,000 a week plus airfare. When someone goes hiking, they pay $200 a week including airfare. Now, I'm not saying one is more important than the other, but I'm saying that overall value of hunting in this area is tremendous. Now, sometimes this difference is made up by more hikers than there are hunters and I'll never forget the time on the north Fork of the Koyukuk, just up from Mount Doonerak, I watched in amazement for 2 days as the sheep went to the river. I couldn't quite figure out why until the second day I saw 21 hikers and 13 brilliant orange tents camped on the river.

To me, that says something for the impact of one type of use that is going to override and do away with another type of use that is very traditional. I think that the burden that this is going to place on distributing hunting pressure throughout the rest of the State when we consider that Dall sheep harvest in the Brooks Range consumes about 1 to 1½ percent of the total population, that the grizzly bear permit system is based on consuming 2 to 3 percent of the total population if they were all harvested. It's been my experience that the many hikers on the backside of the Gates of the Arctic that I have met during the hunting season are very satisfied to see sheep. Very seldom do they know one sheep from another. To see a wild sheep—to see a Dall sheep in the wild—is a great deal of satisfaction. I maintain that this and sport hunting are compatible because the types of animals that we harvest, the types of animals that we pursue, are not those that are commonly seen by those that are hiking.

I think that the burden that this is going to place on subsistence hunting in the Native villages that are in this area, the financial offset that's going to have to be maintained with the guides and the $0.5 million annual renewable resource is something that we must reckon with. Mr. Seiberling and Mr. Udall have maintained that they're not going to institute any new land use schemes at the expense of jobs. I maintain that if this happens, this is going to be the case. We're going to replace a $0.5 million annual resource with something that approaches it only in a fraction when, in fact the two are compatible—when, in fact, the two could maintain themselves for some time.

So I'm proposing that the Gates of the Arctic National Park should be restructured, that the boundaries should be redrawn to reflect true ecosystems, to reflect traditional and historic uses by all types of users, and to try to reconcile the different types of uses that we have today. And I maintain that we can have a park where surface values can be protected. We can maintain a park where we can have a sanctuary and where we can also have an area where we can pursue and continue traditional and historical sport hunting and subsistence hunting by those people who are most involved.

NOATAK, KOBUK, AND CAPE KRUSENSTERN

Mr. QUARLES. OK, we move on now to the Noatak and Kobuk area. Dick, could you make your presentation?

Mr. STENMARK. Richard Stenmark, Land Use Planning Commission. The next complex of areas that we wish to address will be the Noatak valley proper here, which you see over there in the administration's proposal in deep blue, but other proposals also include the Squirrel River drainage in that as well as the Agashashik drainage tributary to the lower Noatak. Also, we wish to address the Kobuk Valley area here, both north and south of the Kobuk River. This particular area has been suggested both as National Monument, National Park, and combination of National Park and Preserve, the Noatak as a national resource land or national ecological preserve. We also in this want to address the Wulik River, since it is kind of bound up in some of the terrain involved in this area. We will also discuss Cape Krusenstern which is proposed as a National Monument.

Mr. QUARLES. All right. We can begin with scenic/landscape/historic/archeological values. Yes?

Scenic, Landscape, Historic, and Archeological Values

Mr. Kauffmann. John Kauffmann, National Park Service. The Noatak basin is, again, a large tract of wild country different from the central Brooks Range and different from eastern Brooks Range—a big, wide mountain-rimmed river basin transition zone between the sub-Arctic and Arctic environment. It is the largest remaining mountain-rimmed river basin we have left in the United States that's still virtually in a complete, pristine condition. There is only one community on the entire river which is 435 miles long, approximately, and that is the Eskimo village of Noatak which is less than 300 people, I believe. The rest of the basin is actual wilderness.

I'll leave the river scenery to Mr. Dapkus and to the coalition people and the wildlife to others, but the general scenery varies as one travels from east to west. The river starts out in the mountains. Actually, the first approximately 70 miles of the river is in the Gates of the Arctic Park proposal that the administration is presenting. Then the country opens up into a broad basin, probably 40 miles wide with the mountains just on the horizon. A big upland area of ungulating tundra land with expansive views on all sides. Then the mountains pitch in again and the river, with the Delong Mountains on the north and the Baird Mountains on the south, come close together and the river flows for about 70 miles through what is known as the grand canyon of the Noatak, a very scenic valley ending in a true cut, upper Noatak Canyon, some 6 or 7 miles long. By that time, the river has reached the northwestern limits of the boreal forest in North America, and flows from then on down to tidewater in Kotzebue Sound.

From the river, much of the land is gentle, but a great deal of the Noatak is very rugged, handsome Brooks Range country, heading up to the Delong Mountains on the north and the Bairds on the south. In earliest days of the (d)(2) considerations—studies after the Settlement Act was passed—scientists and conservationists felt this was probably one of the best choices of all the lands for study from a scientific viewpoint.

Dr. Frank Williamson of the Smithsonian Institution said at the time, it's one of the biologically most significant land water units still left in a pristine state. The National Park Service contracted with the Center for Northern Studies in Vermont to do a biological survey of the area to research this significance further and 12 scientists spent the summer of 1973 in the Noatak basin doing as thorough a job as they possibly could of studying the scientific significance of it. They found it a transition zone, as I mentioned, between plants and animals migrating between sub-Arctic and Arctic environments. They found, with the exception of coastal features, almost every type of habitat found in the far north is in this basin. With probably in the neighborhood of 500 species of vascular plants, it has flora larger than the entire Canadian Arctic archipelago and as large as the entire Alaskan Arctic slope. It size is such that a true wilderness for scientific purposes can be protected here.

Dr. Young, speaking at a symposium in Houston, Tex., 1 year after his work, had this to say, in brief. He is discussing the possibilities of ecological preserves in the Arctic and he points out that the Bering Sea Islands, while they were long isolated after the disappearance of the Bering Land Bridge, do not have large animals anymore and he concludes that an ecological preserve of the tundra bio would have to be much larger than 2,000 square miles, which the island consists of. A truly representative one would have to encompass a large mainland area and as far as the United States is concerned, this means Alaska. He recommends the Noatak, of course. He says it supports about as complete a sample of the tundra biota as would be possible to find anywhere in the Arctic.

We'd need further research on the populations of large animals in the Noatak area. However, I would hazard an opinion that all of the large animals presently found there with the exception of the caribou could maintain viable populations within the Noatak drainage indefinitely. If areas immediately adjacent to the Noatak drainage were added to a Noatak preserve, it seems likely that a stable and healthy caribou herd could also be preserved. For the record, Mr. Chairman, I'd like to introduce an article on the Noatak which appeared in the fall-winter issue of the Living Wilderness in 1974–75, the winter issue, which digests a great deal of the descriptive material pertaining to the Noatak and the significance of it. I should say—as a point of interest—the Noatak is the 11th largest river in Alaska in point of area drained and the 15th in point of volume of flow. This is from Corps of Engineers' statistics reprinted in the Alaska Native and the Land several years ago.

Mr. QUARLES. Does the boundary generally follow a hydrographic divide? Did you mention that?

Mr. KAUFFMANN. The boundary of the proposal you see there is the hydrographic divide with the exception of the upper end of the watershed which is in the park proposal and the lower end, which has been Native selected, from that straight line drawn across the valley south.

Mr. DAPKUS. Dave Dapkus, Heritage, Recreation, Conservation Service. I'd like to talk about two rivers, one the Noatak, as John has already mentioned. I think the value of the Noatak—one of its main values—the highlights and variety of scenery. The Noatak starts in the mountains. It's divided up about equally. Into the mountains is one section. Then you get down into the big basin area in the grand canyon of the Noatak, which is a wide open expanse, all tundra. From there, you run into a short Noatak canyon which is quite spectacular in itself. It is a true gorge with 400 foot high walls where the folds are will evidenced there and the great Z in the middle of the Canyon is very beautiful. And from there, you go into the lower part of the river, which is boreal forest and lake-dotted lowlands. All this combines to make the Noatak highly scenic and right along with that kind of scenery, you see the wildlife, as John's already mentioned, quite varied. The Arctic caribou herd passes through here to some extent, grizzly, sheep up on the upper end of the river. Also, its fishery is good. It's one of the best Arctic char fisheries in the north and it's got a big run of dog salmon and the grayling is very good. The third value would be recreation. The Noatak is one of the fine canoeing—kayaking streams. It has a variety of water, a lot of class I, but a lot of class II and class III rapids which are created by Pleistocene glaciation and you've got a lateral moraines every so for that create very good rapids. Other recreation which can be enjoyed up there—hiking and fishing and the viewing of the wildlife. And John's already mentioned the fourth value, that this is a very primitive area and it has high scientific area.

From there, I'd like to jump down to the Kobuk area we're also talking about and one river down there is the Salmon. The Salmon is much different from the Noatak, as you can see. It's a very short, small stream. Its scenery is very high. It's different from the Noatak in that it's a narrow valley. It starts in alpine tundra, it goes into moist tundra meadows and then finally down into a big spruce hardwood forest. The valley, being narrow, has lots of rock outcroppings that make it highly scenic. This is a very easy float. It's all class I water. That water, I might add, is some of the clearest that one would see. The gravels on the bottom are varied colored. Some of the color is green. It shows the low quality grade that's in the area. It also has a variety of wildlife and probably fishery is its most important thing. It gets its name from the excellent chum and King salmon that run up in the river. It's also a good grayling fishing stream. Thank you.

Mr. Quarles. Yes, anyone else?

Mr. Mills. I'd just like to say a bit about the primitive values of the Noatak. I believe it's one of the most exceptional rivers in the State of Alaska. I spent a month on the river in 1972 and we floated from the upper headwaters all the way down to the village of Noatak and took a motorboat ride to Kotzebue, but it's over 400 miles long and, as John Kauffmann said, you cover just an incredible variety of scenery from high rugged mountains with hiking opportunities to lowland rolling hills and then also very spectacular canyons. Floating through the river, you get this tremendous feeling of space and openness and just a wild, unspoiled valley and I know we saw everything from caribou—we saw grizzly bear, wolf, Dall sheep, I think we saw wolverine. I just think it's one of the most fantastic wild rivers in the State of Alaska.

Mr. Quarles. Yes?

Mr. Hsu. Dick Hsu, National Park Service. This last summer, I was an archeologist working up in the NPRA and adjacent to that area, one of the members of the Alaska Coalition mentioned earlier about the archeological sites of Howard Pass and Inuorak Pass. This is a very important area for we know that the Noatak is a traditional travel route from the Bering Sea up to the Arctic Ocean. The site that we found in Inuorak Pass dates back to at least 6000 B.C. and from the various geological evidences, the Brooks Range in that particular area was clear of glaciers fairly early, perhaps as early as 8000 B.C. The Onion Portage site on the Kobuk has material which is very similar to the material that we found in Howard Pass and we believe that this may be the very earliest corridor that we have in between those two areas. It is also very important in that we have several different culture areas involved. You have the Athabascan Indians in the Interior. You have the West Coast Eskimos and then you have the North Coast Eskimos, and much of that area in there is a transitional zone and we know very little at this moment about how that area was used and what influences were going back and forth. When you speak to various Native groups in the area, they all talk about the Noatak and how much travel was going on between the coasts. There were historical accounts of people traveling all through that area and it was also important as a center for trade where all three different groups would meet there.

Mr. QUARLES. Thank you. Rich.

Mr. GORDON. First of all in answer to some of those questions, I want to point out that there may very well be some Native lands under present Native selection on the lower Noatak that will revert back to Federal ownership.

From the point of land use management, these lands will be surrounded almost 100 percent of the way by various (d)(2) lands when proposals are authorized. But this makes sense from the land management point of view to authorize in the act that any land reverting back to Federal ownership can be included in the Noatak system. Otherwise, we'll have these isolated BLM lands surrounded by (d)(2).

I want to point out just one particular landscape area that hasn't been discussed in Noatak and it relates to the geological principal of headward erosion that I discussed earlier with regard to the west side of McKinley. Namely, it's various climactic regions—presumable relating to differential solar radiation. The erosion on the south flank of the Delong Mountains is considerably greater than on the north flank. As a result of this, two things. First of all, the present hydrographic divide—watershed divide is almost at the extreme northern end of the range. This means that virtually the entire Delong Mountain system is included within the Noatak proposal. Second, because of this headward erosion through and behind what could be considered the physiographic crest, the height of land of the range—you have very steep, hanging, very sharp, rock cliffs sticking out the edge of the canyon, very steep headwalls at the head of the river drainages. In other words, very spectacular scenery forming elements. In particular, as you can see on these maps, a number of the north-south flowing rivers, at their heads, have tributaries or their upper portions flow east-west. In other words, one tributary is going to the west, another to the east, behind the hydrographic divide. In addition to being spectacular, this also allows a really unique travel pattern. I just talked to a fellow who spent 6 weeks hiking through it.

You can hike east-west, right along the crest of the Delong Mountains, going through quite traversable passes, rather easy hiking for the most part except in a few places, because the passes run east-west through these tributaries. Then you come down below the first range of mountains in the Delongs, go up the tributary on the other side, go up another pass and you can go on and on and on and this is rather unique to this area and the Baird Mountains to the south have somewhat the same pattern to a lesser degree. Thank you.

Mr. Quarles. Thank you. Yes?

Mr. Driver. Phil Driver with the Alaska Professional Hunters Association. In my business, I take quite a few photographers into this area and as the last gentleman mentioned that nobody else came up with, some of the scenic part of this whole area is these north-south drainages, the Kelly, Kugururok, and Nimiuktuk Rivers, and with all the experience up there, I'm surprised that nobody else has mentioned this fact. That's where I take all my photographers in particular because of the game that you're able to see and of the beauty itself. To me, the landscape without wildlife is just scenery. It has to have it all in order to be worthwhile.

Mr. Quarles. Thank you. It's time to address the scenic values/landscape/historic/archeological values of the Cape Krusenstern area. Yes go ahead.

Mr. Belous. Mr. Chairman, my name is Robert Belous. I'm from the National Park Service office here in Anchorage. At Cape Krusenstern and we'll have a map up there shortly that Dick Stenmark will place in front of you—we have an archeological resource the discovery of which goes back a good number of years to 1958, when it was excavated by archeologist J. Louis Giddings of Brown University. The area really is a combination of two major elements, that of geological forces at work at the Cape, and also of a unique chronological order of human history that transpired there for the last 5,000 to 6,000 years. About 6,000 years ago, when the oceans came to approximately their present level, the beach ridges of Cape Krusenstern were not there. They accrued since then and the driving force behind this was the prevailing northwesterly winds that eroded the adjacent shoreline, and, as you can see along the northwest lengthwise boundary of the proposal, we take in the essential part of that geological process in our proposal so that the integrity has been preserved and is on-going today, the system that produced the beach ridges of the Cape.

We have a series of 114 ridges there, each of them spaced by some 50 to 75 years apart, that also hold the artifacts, the hearths, the dwelling places of people that turned to the sea for the first time after the flooding of the Bering Land Bridge, and thus, in a unique chronoligical order, we have approximately 5,000 years of human history in archeological form as well as present day subsistence use of the outer beach ridge across the Cape.

In the northern sector, along with the important geological features, we also have some earlier archeological sites that predate the beach ridges along the Cape. Recent excavations have turned up materials associated with pre-Eskimo cultures there that go back some 8,000 years.

Also, between the northern mountain sector of the proposal and the southern cape, we have a large geological mass—known as an "Esker"—that is the remains of Illinoisan glaciation that goes back some quarter of a million years. It is the remains of this period of glaciation that now produces the outflow of beach gravel that supports the Cape in its ongoing construction of beach ridges today—just as it has for the last 6,000 years. So there's a geological cycle at the Cape intimately tied to the distribution of human occupation sites that span every single major phase of recognized Eskimo culture.

The outer portion of the Cape today is also, as it has been over the thousands of years, a very important place of subsistence use, subsistence gathering of resources, mainly sea mammals. Very little goes on on the land there except for the important harvesting of berries, of course, and some taking of fish and some taking of waterfowl. But the major resource taken during that short but critical period of early spring, beginning in some years April, May, June, and going through to the breakup of the ocean ice, is perhaps best described by the Eskimo name for that area—known as Sealing Point. the harvest of seal there, the sea oil that's produced from that harvest, the skin, the meat, all work their way back into, I would say, every Eskimo community of that region, and in some cases far beyond. Seal oil works its way up the Kobuk River to the villages of Ambler, Shungnak, and Kiana, and elsewhere in the NANA region and even beyond. So the people who hunt at Sealing Point—the people who continue this tradition there today—are actually forming, if you will, the latest episode in a long chronological history of Eskimo survival in the Far North. That's about 40 miles north of the Arctic Circle. Those are the major cultural resources of the Cape.

We also have certain geological features there that lend themselves to the area's archeological values, that is, the stable hilltops there, the stability of the soil—free of solifluction for a long period of time, and this kind of geology lends itself to further discovery. So it's not just what we know—what has been there in the past—but also the potential for future discovery. Hilltops that we have investigated there have chips of chert and other forms of stone and flint used for the manufacture of weapons—chips that remain just where they were dropped 5,000 and 6,000 years ago. There is virtually no movement of the stable limestone hilltops in both the southern mountains and the northern mountains of the Cape. That basically is the cultural resource, past and present. I don't know if you would want to add anything beyond that in terms of wildlife, which is the second category, very closely tied to the history of man there, but I will save that for the second category.

Mr. QUARLES. All right. Anything else on scenic, landscape, historic, and recreational values OK.

Mr. GORDON. The visual experience of looking down at the 114 beach ridges from the bluff which is a rock bluff on the inland side of the lagoon, 2 miles from the shoreline, something like that, is quite striking because the curved linear ridges, many of which are filled or partially filled with ponds and little marshes, is a striking fine textured pattern which is repeated over and over and over. Low sunlight with the sun reflecting on the water in these swales is extremely dramatic. The Park Service has some photographs of those. The overall texture of the country is one of an apparent green tundra. It looks like a carpet, although it's very difficult to walk on, with barren virtually unvegetated pale grey to nearly white chalky looking hills and this combination of the bare, almost white hills and the lush green rather wet tundra in between them gives a visual appearance that is not represented in any other proposal I know of. Do you want to discuss the Wulik River at this same time or put that off until later?

Mr. QUARLES. Let's put that off until later.

Mr. SILVER. How far north does the ridge extend from the Cape itself?

Mr. BELOUS. The beach ridges?

Mr. SILVER. Yes, the beach ridges.

Mr. BELOUS. The beach ridge complex ends at approximately the northwestern tip of the main lagoon. Now, there are additional beach ridges not connected with the main Cape north in the lagoons all the way up the coast to the end of the boundary, but they're not connected with the main series.

Mr. SILVER. It's around the lagoon?

Mr. BELOUS. Around the lagoon, right, all the way back to the foothills there.

Mr. SILVER. Thank you.

Mr. BELOUS. Mr. Chairman, I had one other point that I would like just to menton and that is that the Cape itself, far beyond the proposed boundaries, some 2.3 million acres has been designated an archeological district and also elevated to the status of a national landmark and this was done in 1973. That's 2.3 million acres surrounding the Cape as shown in that proposal boundary. That proposal represents about 15 percent—the administration feels the most important 15 percent—of that 2.3 million acre archeological district and landmark.

Mr. QUARLES. Anyone else?

Mr. CLINE. This is Dave Cline, Alaska Coalition. Before you leave recreation values in this part of the country, particularly for the Noatak, I would like to place emphasis on the wild river character of the Noatak River. Having traveled the length of it twice now, I can attest to the fact that it's probably the most outstanding, in my opinion, wild river—greatest variety in northern Alaska for various reasons and I think it's fast becoming nationally significant as a wild river in which to take a float trip. In 1972, it was hard to find a party of river travelers on the Noatak, but the last 2 or 3 years, the number of travelers has increased dramatically to the point where there's even commercial outfitting going on and as we understand it, even outside commercial outfitters will move into the area this coming year.

There's several things that make the Noatak so outstanding as a wild river, I'd say. First of all, it's readily accessible with good put-in and take-out points, you know. With commercial aircraft now flying to Bettles, it's a readily short flight from there to unnamed lakes in the upper Noatak valley and very short portage from these lakes to the river for put-in, traveling then by either canoe, kayak, or whatever to places further downriver such as Noatak or even all the way down to Hotham Inlet and Kotzebue Sound for take-out. So it's a relatively easily accessible river. The vast wilderness expanse and variety of landscapes, I think, is unmatched in northern Alaska. A great deal of variety for the river traveler, outstanding opportunities for viewing wildlife, particularly in the upper valley where grizzly bears, some caribou and birds on the adjacent bluffs are attractive features. It has an excellent and steady current so river travelers can make good progress even against headwinds which are often encountered further down the river. It has challenging but not really too dangerous rapids, outstanding sport fishing values, particularly for grayling and Arctic char. Some of the best fishing for grayling and Arctic char, I think, in Alaska can be found in the Noatak and also adjacent rivers such as the Wulik.

Not to be overlooked are some of the side drainages in the upper valley for extremely scenic hiking opportunities and some of the tributary streams of the Noatak, particularly the Cutler and Aniuk, can be run and have been run with fold boats.

Fishing pressure is light in the area, but increasing rapidly and because of the fragility and low productivity of the environments in northwestern Alaska, I think we're going to have to require dispersed and low density recreation to protect these wildland values in the future and also to protect fishery and wildlife values for local subsistence users. Natives, of course, particularly at Noatak and even further down the river, use the river and its tributaries for subsistence, even recreational activities. So while public pressure and use is going to increase, I feel that we have to look toward cooperative management mechanisms to avoid conflicts with the local residents.

The last point I want to make on recreation has to do with lake trout fishing of some of the larger lakes, lakes like Macherak, Feniak, and Desparation—there are some lakes that would support limited northern pike fishing and, of course, I think it's already been mentioned, there are some sport hunting opportunities, particularly for grizzly bear, moose in the lower valley, Dall sheep and caribou.

Mr. QUARLES. Thank you.

Mr. FIELDS. I just had one point. I'm Ed Fields from Alaska Miners Association. I was wondering if either the National Park Service or Alaska Coalition has some documented figures on the projected usage of these areas through time? Have you made any estimate----

Mr. BELOUS. This is just the Noatak?

Mr. FIELDS. Yes, the Noatak area. What type of----

Mr. BELOUS. Robert Belous of the Park Service. We do know that Kotzebue has had a visitation figure exceeding 10,000. That was 2 summers ago. Last summer's figures are not yet in. They've undergone a strike of the local airline and there have been other complications, but the figures locally have been in excess of 10,000 and we do know that there have been many raft trips on the Noatak. Perhaps John Kauffmann could address just how many, if you have any figures on that.

Mr. KAUFFMANN. John Kauffmann, Park Service. We do not have accurate figures. We do understand that the use of the river has increased markedly. The summer before last, 1976, there were probably in excess of a dozen parties down. I've been getting in my office on the average of about a letter every 2 or 3 weeks—a letter of inquiry from somebody. The last one I got was from Sweden, asking about the river and how you get there and what to do about getting down it. Of course, this area has been seen largely as a scientific research area. I think the emphasis has been more on that to date than other aspects of its significance, but it apparently has captured the interest of a great many people as far as its recreational potential is concern.

I would like to take this opportunity to—on the record—mention that the Noatak basin has received international recognition by having been designated a biosphere reserve in the United Nations' man in the biosphere program. I think that should be noted.

Wildlife and Fish Resources and Uses

Mr. QUARLES. We turn now to wildlife resources. I note for the reader of the record that Mr. Cline discussed wildlife and fish on the Noatak just a few minutes ago.

Mr. BELOUS. Robert Belous, National Park Service. One of the most important elements of the wide spectrum of wildlife in the Kobuk Valley that I'm sure the Departmnent of Fish and Game will get into, is the diversity of species there and the importance of the caribou migration routes through the mountains. The Baird Mountains essentially account for two of the four areas that Carl Gravogel, in his testimony from the Department of Fish and Game, cited. These two are the Nimiuktuk and Howard Pass. These are the more easterly ones. They, in turn, filter across the Noatak Valley to several discrete passes in the Baird Mountains. These passes are related to those sites of human occupation that go back at least 10,500 years at Onion Portage. Those are caribou migration routes of the most critical nature and I get this not from just current observations of the last few years, but from Eskimo history and legend in the area. Those are portions of the mountain ranges where people avoid hunting the caribou on the risk of turning them away from their normal migration paths so that you have a series of passes—I'll cite one, the Hunt River, but there are several up there that are extremely important because they act as funnels through the Baird Mountains and we have, again, the occupation site of thousands of years of use of that caribou, mainly related to the crossing of caribou at that one point in the river. So in the spectrum of wildlife for that valley, this is perhaps the critical, key element, the caribou migration routes through the mountains.

Mr. QUARLES. Anything else?

Mr. GORDON. Nothing more on Kobuk—Krusenstern. I want to make a point here and I'll demonstrate it. The Krusenstern area—first of all, the Andrus boundary does not follow the height of land divides and I want to point that out, so part of this is Native selections, but part of it is not, and even within some of these Native selections, some of these lands may revert back. The boundary should follow essentially the area of ecological and environmental concern there, following the height of land.

The major resources in the Krusenstern area that are not of an archeological nature—I've outlined the visual values—are the outstanding wildlife. At certain years in certain seasons, this can be one of the great—and I emphasize great—wildlife spectacles in Alaska because you have a diversity of wildlife at certain seasons, usually in the fall, in some years. Along the coast, there is a migration of whales reported. That is the major importance for the Eskimo users today just as it has been for 8,000 or more years.

There are significant seal populations along the shoreline. I have seen walrus immediately behind the beach—in front of the beach. Marine mammals are the major resource value. That's why the Eskimos use that area. Second, the lagoon holds over 10,000 geese, primarily subspecies of the Canada goose and white-fronted goose. A major staging area in some seasons and very spectacular in those years. Also, in some seasons, I've seen caribou as was mentioned in great numbers of small herds anywhere from 40 to 80 animals, covering the entire 500,000 or 350,000 acres of the area—just completely covering it in small groups, probably totaling 10,000 to 20,000 animals. And that's a very impressive view.

The area is a good area for birds, because as I mentioned, these hills are free of vegetation—golden eagles and what-not and for carnivores, particularly red fox, which are quite abundant. There are three unusual species that occur in the area. A group of sheep presently occur in this Igichuk group of hills on the south side. It's the western most sheep in the Arctic. In the Mulgrave Hills on the northeastern portion, both a small herd of muskoxen—we've heard these mentioned already. This will be the only place in the National Park where muskox would be, on a year-round basis, represented, and finally, the rather local and uncommon huge jackrabbit which is called the Arctic hare occurs on Rabbit Creek, which is precisely on the portion of the proposal which is outside of the Andrus boundaries, but within the watershed draining in.

Mr. BELOUS. One small point of correction. When you said whale, you meant Beluga whale, I take it?

Mr. GORDON. Beluga whale, yes.

Mr. BELOUS. Beluga whale, not whale.

Mr. GORDON. Yes.

Mr. QUARLES. Anything else on wildlife? Well, in that case, we turn to renewable resources for Noatak, Kobuk and Krusenstern. This is timber, agriculture potential and forage potential, Yes?

Mr. WICKES. Jim Wickes, Department of Natural Resources. On the basis of the Department's statewide assessment for agriculture, meaning cultivated cropping, there is no potential in the Noatak, Kobuk, or Cape Krusenstern Andrus proposals. In terms of forestry, within the Noatak proposal, as defined by Mr. Andrus, some 96,000 acres have been identified, but it ranks in the tenth or lowest percentile in statewide potential. Within Kobuk, some 600,000 acres have been identified, but again, their potential is at the bottom, ninth and tenth levels, on our statewide system. And there have been no areas identified within the Krusenstern proposal. Thank you.

Mr. BELOUS. Robert Belous, National Park Service. The Kobuk Valley has a natural boundary configuration of two crescent-shaped mountain ranges, the Bairds to the north and the Warings to the south, enclosed within which is a combination of values, archeological, cultural, geological and biological, the combination of which is not duplicated anywhere else in the State of Alaska and perhaps not anywhere else on the continent. The first one is its archeological value. The substance of it is covered in many publicaitons, one being "Ancient Men of the Arctic" by J. Louis Giddings which goes into an enormous amount of detail on the importance of the major site there called Onion Portage, a site which is now enclosed within an archeological district of 21,000 acres and is on the National Register of Historic Places. It forms the eastern boundary of the administration proposal for the Kobuk Valley. It is a site that's only been dug to about 20 percent of its extent. Thirty layers of cultural bearing material in Arctic latitiudes where stratified sites are extremely rare. This site has been cited by the Archeological Section of the Smithsonian Institution as the single most important archeological site in the Arctic. Further reconnaisance in recent years indicates that that site is perhaps repeated up to 8 to 10 times down the Kobuk River in the 55 or so miles enclosed within the proposed boundary. These are unexcavated sites with extremely high potential as stratified sites, again, very rare in the Arctic. Additionally, it has neo-Eskimo sites, one named Ahteut, at about 1250 A.D., the largest of its kind, in excess of 100 houses at this one site.

The geological quality of the valley is perhaps best exemplified by the sand dunes, the 25 square miles of Arctic sand dunes, the largest active dune field anywhere in the North American Arctic. Yet this is but one surface oddity of a broader geological property. The most pervasive feature is that the sand really is a substrata for the entire valley, making it a well-drained water condition which, along with its climate, duplicates the land bridge environment. It is a relict environment of the Bering Land Bridge which has been gone for some 12,000 to 15,000 years since the flooding of the Bering Land Bridge. The supporting of that environment we find there—and this is the biological entity within the Kobuk Valley proposal—communities of relict flora, sagebrush growing there today as it did when woolly mammoths and dwarf horses lived in that valley some 12,000 years ago. So we have a relict flora that is dependent upon the underlying sand, not just the sand dunes but the underlying sand, and in addition to that, we have human occupation at Onion Portage and other sites, going back some 10,500 years.

That combination of relict flora still living today and the continuum going back through pollen samples from studies—one I would cite done by the University of Alberta at Edmunton—that combination of human history, biological history, and that unusual geology—that combination is unique to the Kobuk Valley. One part of its flora there is unique in the world. It's a legume named for the Kobuk Valley—Oxytropis Kobukensis—grows nowhere else on earth.

Those basically are the three major elements of significance to the Kobuk Valley, but it would be an omission not to mention the last one and that is the living culture there, highlighted in three very fine publications, one I just mentioned already, "Ancient Men of the Arctic," "The Kobuk River People," again by J. Louis Geddings, published by the University of Alaska, and now out of print, "The Arctic Woodland Culture of the Kobuk River," also by J. Louis Geddings, then of the University of Pennsylvania. The present day uses of the resources within the Kobuk Valley have also been documented in a National Park Service study conducted there and already submitted to the committee, Kuuvangmiit. This is a modern-day study, Kuuvangmiit meaning "People of the Kobuk River: Subsistence in the Twentieth Century." For those who would cite the lack of subsistence in this valley—this is required reading. This entire book is dedicated to the lifestyles of the Kobuk people related back through thousands of years of occupation in that valley.

Mr. QUARLES. Extraordinary job of concise reporting. Anyone else?

Mr. GORDON. First, scenery in Kobuk. I'll be brief. Visually, lower portion of the Kobuk River illustrates all the river-related feature in the Andrus proposal and so forth and here in the context of closely compressed visual features, they're a very different character. The particular river meanderng type of landscape is particularly striking, the complexity of the related scenes. Third, the open spruce type of woodland is better represented in the Kobuk area than anyplace I know of in Alaska. This is primarily on the ancient sand dune substrata, west of the sand dunes and on the south side of the Kobuk River.

In addition to its scientific value, it also is an extremely esthetically pleasing type of vista—silvery lichen and open spruce woodland. Fourth, the middle Salmon—Dave Dapkus has talked about the color of the jade gravel adding to the blue of the river. The hillsides in this particular area have a dappled appearance and this mixture of open tundra and spruce woodland gives a very diversified appearance right in the river basin. Fifth, as in the Noatak, the Delong Mountains, there is significant headward cutting of the rivers on the south side of the Baird River—or the Baird Mountains, just as there is in the Delongs. Particularly notable are the upper portion of the Akilik River and the Hunt Fork, which are major caribou passes, and also in this area, perhaps more so than in the Delongs, there is a large number of small outlying turns which adds to the visual impression. Finally for the Kobuk, this is one of two areas identified in this study and I'm sure there are more in the State in which one has a sense from any low eminence within the valley of being enclosed in a vast basin. The outline of the Baird Mountains to the southwest, the Kallarichuk Hills, comes right down to the Kobuk River. The Waring Mountains are sort of an oxbow on the south. If you're standing on the dunes, they're immediately south of you. There's a similar range of hills that comes down on the east side of the Killik River to the east. Even though the Kobuk River flows through this basin, one has the very strong sense of being in an enclosed basin of which all the parts relate.

Mr. FIELDS. Ed Fields with the Alaska Miners Association. I think something to keep in mind in the Kobuk national wildlife area that we're looking at there is the size of the area that we're talking about in terms of scenic areas that have been identified. The Federal Land use Planning Commission has identified a core area which is a beautiful core area there which covers about 25 square miles which takes up the Kobuk sand dunes, the Indian Portage site that we were talking about here—again, a number of isolated sites along the river which could be looked at and could be preserved, but it doesn't appear as if there's justification for locking up several million acres on the basis of isolated * * *

Mr. **Gravogel.** Mr. Chairman, I'm Carl Gravogel, Alaska Department of Fish and Game. I'd like to take the ecosystem approach that has been mentioned earlier and my remarks will include all the Noatak drainage itself and I'll separate when appropriate the lower Noatak and upper Noatak.

I'd like to talk about the major big game species there and I'll start off with moose. Historical records, both from trappers, miners, and some of the old timers in the area, indicate moose were virtually absent from the Noatak in the early 1900's. A few immigrants moved in sometime during the thirties and the forties and they probably provided the nucleus for the growth of the present herd. The population in the lower Noatak, and I'm referring essentially to the area below the Nimiuktuk—downstream from the Nimiuktuk—has increased dramatically during the sixties and the seventies and now in many areas appears to be approaching range carrying capacity. Based on spring surveys, the lower Noatak moose population is estimated to contain at least 800 moose. The Noatak Valley below the Kelly River winters about 250 moose and the Noatak Canyon, including the drainages of the Kelly, Kugururok and the Nimiuktuk, winters about 500 moose. The middle and upper Noatak—and essentially, now, I'm referring to that area upstream from the Anisak—contains relatively few. Although extensive surveys have not been conducted, I estimate in the flights I've made over the area perhaps fewer than 200 moose reside in that area on a year-round basis.

Overall in the Noatak, bull/cow ratios are excellent, averaging about 77 bulls per hundred cows. Based on our spring surveys, annual recruitment of yearlings averages about 19 percent of the population. In other words, if you were to apply it in March of the year, about every fifth animal would be a yearling. Almost all of the individuals in the population have a fairly small home range, but seasonal changes in distribution have been noted. In general, most of the population would be found along the major river bottoms from December to April and this includes the larger tributaries such as the Kelly, the Kugururok and the Nimiuktuk. Then as the snow begins to melt earlier in the year or around May and June, there's a gradual movement out of these river valleys to higher elevations. Habitat preference, to some degree, seems to be sex-related. In other words, bulls and barren females seem to prefer alpine willow areas, while pregnant females generally tend to remain in the denser willow patches on the river bottoms.

The harvest of moose on the entire Noatak is roughly 75 to 100 animals per year. The majority of these come from the broad Noatak Valley and the Kelly River system. A few moose are taken, also, off the Kugururok and the Nimiuktuk, but to a much lesser degree. The upper Noatak receives very little hunting pressure at all. The lower Noatak—and again, when I say lower Noatak, I'm speaking primarily from the Nimiuktuk on down—receives extensive hunting pressure from both Kotzebue and from the village of Noatak.

Long smooth gravel bars along the river make an ideal location for small aircraft and the main river is deep enough to operate most river boats up and down the river, at least as far as the Nimiuktuk and in some cases, there's high water much beyond that. Both types of transportation to some degree compete with one another, but not to a great degree. Most of the moose in the area are taken by local residents and they act primarily as a meat supplement. There are a few families from the village of Noatak where I think the dependency on moose is much greater than any place else. I think the most important point to emphasize, however, is that there's a great number of people, both in the Kotzebue area, some from the northwestern Alaska area of Nome, who have come to depend on the lower Noatak for both hunting, fishing, and general recreational activities. And although they compete to some extent because they have different transportation modes, to exclude one group over another would create a severe hardship on the local residents.

That pretty well takes care of the moose situation. I'll go on quickly to caribou. Now, some remarks have already been made about caribou with regards to the upper Noatak and I'll try not to repeat some of that. Obviously, there are few caribou that reside in the area on a year-round basis. For the most part, the Noatak acts as a corridor for migrating animals between summer and winter range. Then, if we're talking about the western Arctic herd, which is primarily the herd in consideration here, expressed in total numbers, we're talking about 40,000 to 60,000 animals that use the drainages of the Noatak on a seasonal basis.

The western Arctic herd has been estimated to be now about 75,000, but obviously, some of them do not use this for the entire year. Some migrate to the east of it in the Alatna Valley and there are some that reside year-round on the North Slope. But there are four major corridors that the caribou utilize. These are the extreme western end of the Brooks Range, coming down from Point Hope, Kivilina, and then into the lower Noatak. The second area is the Kelly and Kugururok drainage system and these corridors, if I haven't mentioned it, are primarily in a north-south direction. The third is the broad Nimiuktuk Valley and dropping over then into the Salmon and Squirrel River drainages. The fourth is the Howard Pass area, the upper part of the Noatak, and then into the Cutler River. And finally, I guess you could classify a fifth area that would be the extreme upper Noatak, the headwaters of the Nigu, the Noatak and then over into the Alatna, but this is of much lesser importance.

I quess it goes without saying that since caribou are unpredictable, it's impossible to say how these routes are going to be used on a year-to-year basis. They have various tendencies. To give you some specific examples, though, in the fall of 1975, we counted over 40,000 caribou that came down the extreme western route, essentially from the village of Point Hope on down along the coast, inland 10 to 50 miles past Kivalina and the Wulik River, on down and passing north of Kotzebue, anywhere from 5 to about 40 miles, and then on into the Kobuk River drainage. Minimum count of about 40,000 animals. The last two falls, they primarily followed a different route. There's been anywhere from about 10,000 to 20,000 animals that have used the Nimiuktuk and the Howard Pass area and then passing into the Kobuk.

The utilization of animals is very similar to the situation that I outlined for moose. People in small villages, particularly near the migration route, depend on them heavily as a meat source and generally boat or snowmachines are used as the transportation to obtain them. However, residents from the villages of Kotzebue, to some extent Nome, and some of the people from the more affluent villages hunt them throughout the year using aircraft. Residents of the area depend on caribou as a supplement to their diet and I think it's very difficult to draw a line between the resident who is what you might say a subsistence user and one who does it primarily for recreation. In other words, there are a lot of people living in Kotzebue who consider themselves subsistence users, but they may be in the income of $30,000, $40,000 bracket and it's very difficult to draw the line. There are also a number of guides who operate in the area, 3 to 10 depending on the year and the regulations involved. They take both moose and caribou from the lower Noatak, middle Noatak and upper Noatak and for the most part, they compete to a limited degree with local residents who also use large animals.

Quickly, then, on to sheep. There are at least two distinct populations of sheep in the Noatak. That's those of the lower Noatak and those of the upper Noatak. Upper Noatak population includes portions of the Endicott, Schwatka Mountains and the lower Noatak encompasses essentialy the Baird and Delong Mountains.

Surveys indicate that there is nearly an area devoid of sheep essentially east of the Nimiuktuk, and as you transfer east through the Brooks Range, you pick up sheep again about Howard Pass and there's an area there of 60–100 miles with virtually no sheep. Based on aerial surveys during 1975 and 1976 in the upper Noatak, we estimate the population is about 1,000 sheep. Minimum population actually observed was 539 individuals. This included 30 mature rams—rams three-quarter curl or larger per 100 ewes and 33 rams per 100 ewes, so productivity is relatively good. The majority of the sheep on the upper Noatak—some are on the north side of the river. As a matter of fact, anywhere from 50 to 200 sheep can be right on those cliffs and you can see them from the Noatak proper. That's one healthy population.

The second population is the lower Noatak. It is less abundant and density per unit areas is considerably lower, also. This condition may in part be attributed to more winter influence, probably an influence of coastal conditions and the fact that not snow depths so much, but icing conditions on the snow makes it harder to forage for food. Aerial surveys during 1975, 1976, and 1977 indicate the population to be at or about 600 sheep. The minimum number of animals observed was about 401. Mature rams, again, three-quarter curl or larger were 13 percent of the population. Productivity is good—about 44 lambs per 100 ewes.

Both the upper and the lower Noatak population have exhibited a tendency to move back and forth across the Noatak. In other words, in a north-south direction, but there's been very little indication at all of interchange between on an east-west direction, so the lower and the upper Noatak populations are rather discrete.

The reported harvest from both populations is about 15 to 30 mature rams a year and generally is about evenly distributed between the upper and the lower Noatak. Despite this numerically low harvest, both the upper and lower Noatak is a popular hunting area for residents of northwestern Alaska. The upper Noatak receives a substantial number of flying hunters from Bettles and obviously, almost all access is by aircraft, either by landing on gravel bars or by using float planes. On occasion, there are a few sheep hunters who hunt the Noatak Canyon by boat and they use the village of Noatak or Kotzebue as a supply point, but this type of activity is limited. In the past, subsistence hunters have commonly taken sheep during the winter, using dog teams and snowmachines. To a limited degree, this practice still continues today, but it is a very limited value and I doubt that it amounts to more than 10–15 sheep a year. Essentially, then, all the consumptive use of sheep population has been by sport and recreational hunters and the Alaska Professional Hunters Association has better statistics than I, but there are at least three full-time regular guides in the area.

I'll go on to grizzly bear. There are numerous bear along the entire Noatak, as anyone who has floated it can readily see. The population in the lower Noatak appears to be considerably denser than that of the upper Noatak. There are no active population assessments available and it's very difficult to do aerial surveys. A lot of the data is put together by bits and pieces. But there is an ongoing research study on the north slope in the vicinity of the calving grounds and we can extrapolate from some of that.

Probably, there's about 1 bear per 50 square miles on the lower Noatak. It's not uncommon in the fall in a flight from Kotzebue to, say, at the head of the Kugururok, to see as many as four to six bears. One flight on the Nimiuktuk in the fall, 15 minutes out of camp, I saw 6 individual bear. This is the exception rather than the rule. The harvest is relatively low, particularly on the upper Noatak. The reported harvest is about 5 to 10 bear a year and I should emphasize this is the reported harvest. I'd say about half of these are taken by local residents of the area and the other half are divided up among sport hunters with the assistance of a guide. There are a few bears that are taken by local residents of the area that are not reported. Most of these are in defense of life or property. They're considered to some degree in the villages a nuisance. They get into a fish camp and the bear is taken and never reported.

I'll go on to furbearers very quickly and sum up my remarks. There are a number of furbearers in the entire Noatak. All the major species are represented. In descending order of abundance, we have fox, wolf—they're probably the most common—followed by lynx, wolverine, and land otter and martin. Very few martin except in the lower Noatak. Almost all the fur are taken by commercial trappers as an income supplement. Some wolf and wolverine are used locally in the villages for the garment industry, but again, if they cut up the animal for ruffs, often two or three of the ruffs are sold for the family or friends, so some money is often derived from it as well.

In summary, I can say that the Noatak is rich in wildlife and some of the species are quite abundant. To date, with very few exceptions, utilization in general of all these species has low annual productivity. The exceptions are consumption of the immediate villages such as Kotzebue and Noatak, local populations have perhaps been hunted beyond annual productivity. Everyone knows the situation of the Western Arctic herd, but in general, hunting pressure and number of animals taken is far below annual productivity. There are three main consumptive users involved, sport hunters, subsistence hunters and recreational of these latter two—the subsistence and recreational hunters—a vast majority are local residents of the area. But again, I have to emphasize it's almost impossible to put a nametag on an individual to classify him and to say that this one is a subsistence hunter and this one is a recreational hunter. In essence, there is a continuum of uses by all the local residents of the area and I think if you'd ask any of them, their basic objective there is to put meat on the table as a supplement to their income. I have other statistics and data.

Mr. QUARLES. Very comprehensive statement. Does anyone want to add to that?

Mr. CLINE. Dave Cline, Alaska Coalition. Just one question of Carl. We have information that in 1970, 36 muskox were transplanted to Cape Thompson and that at that time, Alaska Fish and Game Department identified the Mulgrave Hills, 8 to 10 miles west of Noatak village, as a possible winter-summer range. Do you see any future range expansion by muskox, should they become well-established in the region?

Mr. GRAVOGEL. Yes and no. That transplant in 1970—those individuals that the Department referred to—probably has since either moved on or been removed, one or the other. There was a transplant this year and we have reports recently of some muskox again. These are stragglers in that area occuring essentially west of Noatak in those Wulik Hills and sometimes as far south as the Kuzitrin area. But to answer your question, yes, it's conceivable that the muskox herd could very well expand over into some of the drainages of the Noatak. I don't foresee this happening within the next 10 years. There is a population of muskox from that 1970 transplant that are wintering on the Kukpuk River immediately east of Point Hope. They constitute about 25 to 30 individuals at the present time. Productivity has been relatively good; attrition out of the population has almost kept up with productivity. In other words, the older bulls are wandering off or they get taken by wolves, and so the population hasn't increased as fast as we'd like. To answer your question, if we reach that threshold level, probably somewhere between 15 and 100 individuals, I would anticipate, yes, the muskox would probably die off pretty fast.

Mr. QUARLES. Yes?

Mr. DRIVER. Phil Driver, the Alaska Professional Hunters. I might add a little bit more on this muskox question.

There are four individuals that have maintained themselves along Rabbit Creek which is in the very north edge of the Krusenstern withdrawal. They've been there for the last 5 or 6 years, but there's no reproduction from that group, and I did see individuals long the Wulik River. I have a permanent home—I live in there 6 months out of the year. There's a couple of individuals I see there all the time, but there's no reproduction. I'll go ahead with the rest of my statement.

Mr. QUARLES. Please do.

Mr. DRIVER. I want to bring to the attention of the committee that Mr. Gravogel's input is very good and it corresponds with my own personal observations. I think we should consider the Alaska Department of Fish and Game has very knowledgeable people who know what they're talking about. The State of Alaska has issued seven exclusive use permits in what is going to be the Noatak withdrawal. That income from hunting alone from those seven permits is roughly $120,000 a year to the people involved there. This last year, these 7 individuals contracted 23 separate individuals for hunts for all species of animals that live there. I would guess that this shows a use of 120 man-days within the withdrawal by hunters who are enjoying a complete wilderness experience, not only hunting but being outdoors, the scenery, fishing and what-have-you. It's a good area to hunt because all terrestrial wildlife is available in this withdrawal and as long as it's managed properly, I think you could hunt forever and ever and people who just wish to go in there to observe and hunters could get along with no problems. There were 34 sheep taken out of unit 23 of this that's——

Mr. GRAVOGEL. I didn't have that figure.

Mr. DRIVER. Yes, but that includes all this area which is over in the Gates of the Arctic, also. Maybe 15, 16 sheep a year on the average coming out of the withdrawal.

As far as the fishing goes, I for the past several years have been using primarily the Kelly, Kugururok, and Nimiuktuk drainage for char fishing and I probably put a use of roughly 200 man-days a year fishing over in there with sport fishermen. The catch and release program is what I advocate. As far as the other individuals, I don't know how much fishing they do. Nelson Walker, who has a guide's license—he's a guide out of Kotzebue—says he does about 100 days of fishing up in that area. He has extensive holdings up in the upper Noatak where his main camp is. My main holdings are outside of the park, but I do most of my operations within the park. I must elaborate at this time on the Wulik River—are you going to set that aside?

Mr. QUARLES. I think we'll do that when we do the other rivers in the NPRA.

Mr. DRIVER. OK. One thing I might bring to the attention of the workshop—over the past year or so when this (d)(2) thing has been coming to a head, we keep hearing referrals to what big business is or isn't going to do to the State. I don't think very much has been taken into consideration of the little man, which there are many hundreds and hundreds in the State, who make their living from using the wilderness and I'd like to see more consideration given to this type of person.

Mr. QUARLES. Anyone else on wildlife? Yes.

Mr. REGNART. My name is Ron Regnart with the Alaska Department of Fish and Game. I'll speak briefly on the fishery resources of this area. The major species are chum salmon, to a lesser extent pink salmon, char, sheefish, several species of whitefish, pike, and lake trout. The chum salmon population of this area is unique in that it is the largest population found this far north on the continent. The sheefish population also is similarly unique in that the sheefish population, again, is one of the largest in the State and sheefish outside of Alaska is only found really in one other part of the continent in parts of northern Canada. In terms of the Noatak River, the number of spawning fish that have been counted—I'd say over the past 15 years, studies have really taken place—have been up to 900,000 spawning in a single year. This is one of the largest chum salmon spawning areas anywhere in Alaska. The majority of these fish spawn in the lower Noatak River downstream from the confluence of the Kelly River. We have smaller spawning populations in the Kelly, in the Eli, and very scattered population occurs in about three areas upstream from the confluence of the Kelly. Char are very abundant in the area. We have not attempted to enumerate char as we do salmon, but I have personally observed in the lower Noatak River chars numbering several thousands individuals per a single school.

I'm going to reference the Kobuk River, also, because of the importance of both the Noatak and the Kobuk River salmon runs to the commercial fishery that I'll get into later.

The Kobuk River salmon population will number up to 100,000 individuals in peak years. The majority of the spawning occurs in three areas, the Squirrel River and the Salmon River which each have spawning populations that range up to 30,000 fish on peak years, and then the upper Kobuk River above the village of Kobuk has another substantial population, anywhere from 15,000 to 30,000 per year. There are two differences in the spawning distributions on the Squirrel and Salmon Rivers. We find chum salmon going throughout the length of the Squirrel, all the way to the headwaters and the spring areas at the head, whereas on the Salmon River, we find mainly the population only extends up to the foothills. Sheefish—the major spawning ground probably in the State occurs in the upper Kobuk River. In the early seventies, we conducted a tag recovery study. We estimated population at that time of spawners about 12,000 fish. These are very large fish ranging from 8 to over 50 pounds.

In terms of commercial salmon fishing, it is a major local economy in the area. The average salmon commercial catch in the last 5 years was averaging 390,000 fish with an average income per year of just slightly in excess of $1 million. The record catch during the last 5 years has been 630,000, bringing nearly $2 million to the local economy of Kotzebue. About 75 percent of the catch is produced from Noatak River spawners and about 25 percent of the catch is produced from Kobuk River and this is the result of the tag recovery study we did in the late sixties. There are about 219 permit holders, commercial fishery entry permit holders, and we have a total of maybe 500 fishermen that participate in the fishing. These are entry permit holders plus helpers that they have on board the vessel. Up to 8,000 char are taken annually in the commercial—incidentally caught in the commercial chum salmon fishery and sheefish—commercial catch in the area ranges from 2,000 to 4,000 fish each year.

Turning briefly to subsistence fishing, the salmon subsistence catch ranged from 15,000 to 30,000 fish a year. Most of these are taken in the Kobuk River villages. Char, we no longer do intensive subsistence char surveys, but in the early sixties, in the village of Noatak, for 1 year, we recorded 32,000 char taken for subsistence. Sheefish—the subsistence catches were probably up to a peak in the late 1960's when we recorded catches of up to 34,000 sheefish. These are again, now, subsistence catches. About 10,000 of these fish were taken in the Kobuk River villages. The rest were taken in Hotham Inlet and Selawik. Whitefish catches are not documented, but we know that the catch must number in the several thousands, probably in the low hundred or so thousand.

I think Mr. Driver talked very well about the char sport fishing potential. It is quite high and there's a lot of room for growth in this fishery. The Kobuk River sheefish sport fishery is quite limited at the present time, but again, it has considerable potential.

In terms of management and research activity of the Department in terms of fishery, I'd like to point out that the combined fisheries of the subsistence and commercial fishermen results in a very intense utilization of the salmon resource and also char and sheefish and I'd also like to remark that the chum salmon population in this area exhibits tremendous variation in size each year. We have spawning escapements on the Squirrel, for example, that may range from 3,000 fish 1 year followed by the next year of having 30,000 or 40,000 fish in escapement. These considerations require a very high level of management precision by the management agencies. In order to accomplish this type of precision that is required, we conduct low-level aircraft surveys, flying into the spawning streams to let off crews to sample the fish in terms of age and sex composition, to collect tags.

We have a test fishing site on the lower Noatak that we hope to extend to the Kobuk as soon as the funds are received. The Noatak River is a large river that is—oftentimes it precludes good counting, good enumeration. We plan to install sonar sites to get a better enumeration of the salmon run in this stream.

I'd just like to point out that the commercial fishery and the subsistence fishery which often occurs many miles distant from the relative pristine spawning areas are dependent on these spawning areas for production and in order to basically manage this intense fishery, we must be able to continue to conduct our various management research activities in the areas where these fish spawn. Thank you.

Mr. LENT. Peter Lent, Fish and Wildlife Service. I just wanted to supplement briefly the excellent remarks that Carl made regarding caribou. In addition to the movements he described, there has been in many years a major west to east movement of caribou during the early summer, postcalving period. The movement along the crest of the Delong Mountains on either side of the crest and probably a corridor of movement for the same reasons that Rich Gordon mentioned—ease of walking, as passes are relatively easy and in addition, the timing of the movement is such that the vegetation at the higher elevation along this crest is greening up. Now, this movement could also very well have been mentioned under the scenic values because it frequently coincides with so-called post-calving throng or aggregation. It's a time of year when caribou can be seen in extremely large numbers, aggregated closely together. It's one of the most spectacular wildlife sites available in North America. These aggregations in some years have moved from the Kelly River as far west as the Nimiuktuk and I've personally seen as many as 100,000 caribou, which about 75,000 were in sight at one time, moving up through the upper Kelly and Kugururok.

Mr. QUARLES. Anyone else? Yes?

Mr. GREIST. Bert Greist from NANA Regional Corp. We've got about eight villages that use the Noatak proposed withdrawal area, particularly Noatak, Kotzebue, Noorvik, Kiana, Shungnak, Kobuk—use this area for hunting, fishing, and in 1972, they did the study on the consumptive uses of mammals, fish, fowl, and vegetables—or vegetation that they gather from the area within the ecological unit—ecological boundary which includes Noatak and it totaled to about 4½ million pounds of mammals, fish, fowl, and vegetation that we gather in the Noatak area. And in regards to recreational hunters, I doubt if we have too many of those because the type of economy that is up there, I think it would be pretty hard at this time to really see the recreational hunter up that way because I think we got ninety percent plus would probably be subsistence users. We simply don't have the jobs available up there to have substantial number of recreational hunters. They're basically subsistence oriented.

Mr. QUARLES. Yes?

UNIDENTIFIED MALE VOICE. I had some comments on——

Mr. QUARLES. You'll have to come to the table.

Mr. HOLLOWAY. I'm Mike Holloway. I'm currently working with Rural Community Action Program on subsistence. I have been a physician with the Native Health Service in Alaska for over 5 years. I think there's a potential conflict between wildlife resources, both for subsistence and for other recreational uses, in corridors and on wildlife as a resource, I think that it's a resource in the sense that people come here for tourism for dollar values to the state to visit and see wildlife. They are directly opposed to the people who utilize the meat and especially the rural subsistence users, both Native and non-Native. This has a tremendous dollar value in food as the different harvest estimates have shown. There are no good nutritional studies available on this for the entire state, but probably a good guess would be that eighty percent of the protein to rural peoples comes from locally gathered foods. This is not, as we heard this morning, eighty percent marine mammals. In some places it is along the coastal areas, according to how the species are spread. It's highly fish on both coastal and Interior areas, and in the Interior and coastal areas there's access to moose and caribou by river and overland. Of course, I was unable to give a dollar value to the cultural aspects. I think that the corridors will be tremendously important in the future impact on the wildlife, both through destroying habitat and by dividing habitat by having secondary population increases along those corridors.

Mr. QUARLES. Are you talking about surface transportation?

Mr. HOLLOWAY. Surface transportation, such as we've heard this week a good deal of comments regarding our western highway systems and what-not and there have been bush hearings, both by BLM, several years ago when they had their corridor system proposal, and also on State land this past year that bush people are against roads. They have been for local development of resources in most instances and many of them have been for local use of local resources such as logs—locally subsidized sawmills instead of flying in and building either Federal HUD housing or OSHA housing, which has proved to be inadequate in the cold weather, and to maybe use resources locally as much as possible. No fixed corridor system to be formed.

One problem is the corridor system with the pipeline is a question as to where the caribou will cross development lines. In Siberia, there have been some studies with both railroad and other roads to see and a large percentage of the caribou will turn back and will not cross these lines. So if we divide the Arctic and sub-Arctic area migration route, I think that there will be major consequences on the caribou, for instance. Another conflict I want to address is between urban and rural hunters. This past spring, I've been going to local advisory fish and game board meetings throughout the interior and at Galena, the Fish and Game figures that moose meat shipped from Galena by scheduled commercial flights in 1975—that was 5,000 pounds, 1976 was 18,000 pounds, 1977 25,000 pounds, and of this latter, 14,000 pounds went to Anchorage and 7,000 pounds went to Fairbanks.

I think this type of impact shows that maybe there have been population drops in some species, more hunting on other species, and that I do think that within the short time, there will be direct conflict between sport and subsistence hunting and the subsistence needs to be protected with some allocation according to need, locality, and availability of alternate resources.

Mr. QUARLES. We can have one more comment on wildlife.

Mr. CLINE. Dave Cline, Alaska Coalition. No mention has been made, I don't believe, of the bird resources in the area. I'd like to offer a few brief comments. The diversity of habitats in the Noatak Valley in particular has been stressed and this is responsible for approximately 121 species of birds or 31 families are known to occur in the area and we suspect there are at least 31 additional which can be expected to occur. Twenty-five species of these birds are waterfowl, including 200 pairs of whistling swans.

The whistling swans in this area are the western population which migrates to Utah and California. So it's important to stress that their nesting densities on the lower Noatak—some of the highest densities recorded in North America. There was one pair of swans per square mile. This is nearly three times that on such places as the Yukon Delta, but not quite as high as what's been reported on the Colville Delta. Approximately 121,000 acres of wetlands suitable to nesting swans and other waterfowl on the Noatak River flats, 34,000 acres on the Noatak River Delta. The delta is particularly important for staging of swans, waterfowl, shorebirds, other water birds, spring and fall. The population of lesser Canada geese in the Noatak—these birds winter in California, primarily. White-fronted geese that migrate to Texas and Louisiana—they nest in the lake region of the lower valley, on what we're calling the flats. There is known moulting of geese on plateau lakes between the Noatak River and Feniak Lake, recorded at least 7,000 moulting geese by the Fish and Wildlife Service serveral years ago. It's also important to stress that there are a limited number of sandhill cranes nesting on the delta. Sixteen species of raptorial birds important to the region, particularly rough-legged hawk, golden eagle, probably a very few peregrine falcons which is an endangered species, of course, along with gyrfalcons and possibly a few ospreys in the lower canyon. And there are also—at least four species of——

Mr. QUARLES. Any other discussion——

Mr. CLIFFORD. Bert Clifford with the Soil Conservation Service. Again, based on H.R. 39, there is within the three units reindeer possibilities. Again, for the record, approximately 3½ million acres in the Noatak Preserve, 1.3 million acres in the Kobuk proposal, and about nine-tenths of a million acres in the Cape Krusenstern National Monument proposal.

Mr. SILVER. How much in the Kobuck again?

Mr. CLIFFORD. About 1.3 million acres.

Mr. QUARLES. Anything else?

Mr. LENT. Peter Lent, Fish and Wildlife Service. I'd like to address the so-called potential for reindeer grazing in these areas. The history throughout the Arctic, both North America, Europe and Asia, has been that reindeer herding as an industry based on domestic animals and occupancy of ranges by wild reindeer and caribou are incompatible. The history in northwest Alaska fully supports and documents this conclusion. At the time at the end of the century, in the early part of the 20th century, caribou numbers were extremely low in northwest Alaska, the reindeer industry was developed. With the increased numbers of caribou, numerous problems arose, in part based upon the intrusion of caribou into range occupied by domestic reindeer and the reindeer industry has suffered accordingly.

Similarly, another example I'll mention briefly in the Soviet Union on the Kola Peninsula at about the time of the Second World War, the wild reindeer or caribou in that area were nearly extirpated. Only a small number were left. At that time, a small zapavednik or national preserve was established to protect these. Since that time, in this relatively small preserve, the numbers of wild reindeer have increased substantially. As they've increased, their migratory routes have accordingly increased and they are now into severe conflict with the domestic reindeer industry surrounding that small preserve.

Mr. WILLIAMS. What is the conflict? Competition for forage?

Mr. LENT. The conflicts are many. Competition for forage is certainly one. Others I'd mention, of course, is loss of reindeer unless they're extremely carefully herded, which has not been the history in Alaska, certainly. They will move off with migratory caribou. Thirdly, there are problems with disease transmission between wild and domestic animals. Fourth, they mention that predators, particularly wolves, frequently follow migratory caribou and therefore are brought into the range of the domestic animals and cause problems and also cause increased demand for predator control

Mr. QUARLES. Any other comments on—yes?

Mr. SILVER. Can I ask Bert Greist whether NANA has any comment on reindeer herding in that area as opposed to the Seward Penninsula?

Mr. GREIST. We've got right now the largest herd in Alaska for reindeer and it's grown quite considerably and pretty fast, despite the type of information that we have about reinder herding these days. We will be needing some more room for expansion in the future. We've only got enough room to graze 4,000 reindeer, which we have right now, and in the future, we will be needing expansion room.

Mr. SILVER. I guess my question was whether or not you were looking to north of Kotzebue for expansion.

Mr. GREIST. Yes, we've had reindeer herds up there in the 1930's, even earlier than the 1930's, when the reindeer industry initially started.

Mr. QUARLES. Do you have any plans to expand into the Kobuk?

Mr. GREIST. Into Kobuk? Possibly not. I think we will be having problems with BLM, trying to acquire grazing areas over that way, but we would like, if possible, to expand around as much of the existing grazing area we have right now.

Mr. QUARLES. On the Peninsula?

Mr. GREIST. On the Peninsula.

Mr. QUARLES. Yes?

Mr. TILESTON. Jules Tileston, BLM. For the record, as a summary of reindeer herding down on the Seward Peninsula—it would come up, but just since it's come up now, I am submitting a 1976 environmental assessment report specifically for the expansion of reindeer in the Seward Peninsula area. In terms of the issues and the conflicts, it lays them out here and it addresses this.

State and Native Land Selections

Mr. QUARLES. Any others? In that case, the next thing is the land selection situation. Jim, do you want to address that first?

Mr. WICKES. Thank you. Jim Wickes, Department of Natural Resources. The Andrus Noatak proposal—there's no State land within the boundaries. There are 136,000 acres of land indicated as being high interest for State selection and this is around the area associated with the Red Dog prospect, about which I'm sure we'll hear plenty later. A hundred and thirty-six thousand acres total some 2 percent of the entire Noatak preserve. In Kobuk, again, no State land, no State interest selection at this time.

Estimated final Native holdings, 16,000 acres. The Krusenstern proposal of Mr. Andrus—no State land, some very low priority State interest selections along the coast, and apparently no Native selections.

Mr. QUARLES. You forgot to mention Native in Noatak.

Mr. WICKES. I'm sorry. We estimate there will be 1,600 acres and I'm not sure what kind of selection that is. It's a relatively small selection somewhere.

Mr. QUARLES. Yes?

Mr. GREIST. We've got historical and cemetery sites in Noatak, Cape Krusenstern, the Kobuk and the proposed Selawik refuge. In all of the (d)(2) interest areas. We do have some selections for historical and cemetery sites, a very small selection under 14(h)(8) above—40 miles above Noatak for mining.

Energy Resources

Mr. Quarles. Any other comments on the selections? We will move then to energy resources, again, on the Noatak, the Kobuk and Cape Krusenstern.

Mr. McIntosh. Ron McIntosh, Alaska Oil & Gas Association. The Noatak, Cape Krusenstern proposal areas lie within the overthrust disturbed belt flanking the Brooks Range with oil and gas potential objectives ranging from Mississippian and Devonian carbonates to Cretaceous clastics in age.

This complex geological structure creates numerous opportunities for anticline and fault related structures. It's a difficult exploration province. It requires all tools, access for geologic surface parties, seismic surveys, and drilling in order to properly assess it. Within this disturbed belt, my colleague with the USGS has commented to potential reserves. Fifteen years of petroleum exploration has taught me to mistrust these studies other than in the broadest scale. Remember, no geologist can tell you where these potential reserves are, only the basin outlines within which the hydrocarbons may occur. This vast area of the basin within these withdrawals is almost totally untested with no or few wells. This means that there is no adequate evaluation of oil and gas potential. It needs to be pointed out that good evaluation does not coming from a single agency or a single oil company looking at the surface geology and making conclusions. This type of conclusion is of limited value and often is misleading. The Rocky Mountain thrust belt, which in many ways is analogous to this disturbed belt, has become productive only after numerous companies have explored it over two or three decades—tremendous effort. Geologic surface parties have been run frequently by various government agencies in the area and NPRA in the past years, but I'd like to point out that last year, it was only with exceeding difficulty that an industry surface geologic party was permitted in the area. With all due respect to the naval and government agencies conducting explorations in NPRA, I, as an explorationist, do not feel comfortable with the present results of that program, which undoubtedly impacts this acreage, at least as I understand those results.

The yellow band on the map on the wall, which covers all the withdrawals that have been proposed across the slope, points out that from the yellow to the coast is an area the size of California. As presently depicted, access to that area is limited to the existing pipeline corridor. This is further complicated by the various wild river proposals which chop the overall area up into different pieces. This becomes very important when we recall that it costs approximately $8 billion to build the 800 miles of TAPS line. Extra line and difficult access can result in sizable or giant oilfields being left economic failures, even if we are desparate for the use of the oil and gas. The oil and gas industry can work within regulations. Multiuse is viable, as demonstrated by oil production, hunting, fishing, and boating in the Kenai Moose Range. It is crucial that pipeline rights-of-way and access be provided within the final withdrawal designation.

Several comments have been made about caribou and pipelines. I would like to add some personal observations to these. Caribou are quite common in the summer within the Prudhoe Bay operating area where we produce oil and gas. Human and mechanical activity does not seem to disturb them enough to leave the area. In fact, they climb over and under pipes, roads, et cetera, and do everything except use the ramps and accesses which have been so carefully provided for them. I think that is a value in consideration. In summary, this is a large area. Once again, it lies with the foothills belt. It is prospective. There is a thick section available. It is essentially unevaluated.

Mr. Williams. Your comments are basically to all three of the areas?

Mr. McIntosh. Yes, they're to all three of the areas. I would like to expand to include the Chukchi Sea and wildlife range up along the Point Hope, Cape Lisburne areas. They are sort of part of it and can be covered with just a couple of comments.

Mr. Quarles. Sure.

Mr. McIntosh. All right, thank you. Going further up then into the Cape Thompson, Cape Lisburne areas, and the withdrawals in there, these areas are also additionally prospective for oil and gas. Devonian and Mississippian is exposed with thrust sheets nearest to the coast at the surface and somewhat back from the coast, 50,000 feet or more of Cretaceous sediments with excellent potential and good reservoir rocks, at least as observed from the surface, are available. This is a extremely interesting area from the viewpoint of oil and gas accumulations. It does have surface features and is highly prospective. There is one other aspect of the Noatak, Cape Krusenstern, Chukchi withdrawals that have a strong impact on the potential oil and gas in the area and that is that looking at the withdrwals in the area, particularly those withdrawals and over on the south side of Kotzebue Sound, takes away access to most of the tidewater in the immediate area. Kotzebue Sound and the immediate basins offshore are Tertiary and Cretaceous basins which are untested and which a very limited amount of seismic data has become available—has been by industry, but sufficient data is there to demonstrate the existence of a sedimentary basin and a sedimentary basin that should be prospected. Thank you.

Mr. Quarles. Yes?

Mr. Cline. Dave Cline, Alaska Coalition. Just a brief comment in regard to the only access to the North Slope being the pipeline corridor. I think it's important to recognize we also have marine access and the fact that Global Marine Corp. is seriously evaluating the possibility of operating icebreaking tankers year-round from the North Slope if needed in the future may well prove the most feasible means of moving oil and gas from the North Slope.

Mr. Quarles. Anything else?

Mr. McIntosh. Mr. Chairman, may I make an additional comment?

Mr. Quarles. Yes.

Mr. McIntosh. With respect to the marine transportation to and from the North Slope, the oil industry has used marine transportation into the area in the form of barges to bring materials in for the development of Prudhoe Bay field. This is a extremely difficult and chancy circumstances with unpredictable ice conditions. Some years, the ice goes out far enough so that the barge transport is viable. Some years, it is with great difficulty that you are able to move barges into the area. At this stage, to my knowledge, there is no study the industry has conducted that shows that marine transportation of oil and gas from the North Slope is a practical solution for the immediate or perhaps longer term future.

Mr. QUARLES. Yes, Steve?

Mr. SILVER. I just wanted to ask Dave a quick question. Are there any environmental objections to icebreaking tankers?

Mr. CLINE. A great deal of environmental concern, but Global Marine is proceeding, I think, in the right manner in this regard and has already gone through the conservation community to see what their primary concerns are. Of course, there will be the danger of oilspills, but the routing of any future icebreaking tankers will be critical. Yes, we do have concerns, but I think the manner in which Global Marine is proceeding——

Mr. SILVER. Thank you.

Mr. QUARLES. Yes?

Mr. BELOUS. Robert Belous, National Park Service. One point on the oil and gas potential that we would like to submit. The geological assessment of the area is perhaps best measured by a drill core and there have been two, one at Killeak Lake just south of Cape Espenberg on the Seward Peninsula, and the other one just near Kotzebue, both by Standard Oil of California. Some of the data recently released on those cores indicates—and we'd be happy to submit this report by Dr. Forbes of the University of Alaska—indicates that the potential for oil in this basin—the Hope Basin—lies offshore rather than onshore so that the terrestrial complications may really be no complication at all if the major center of gravity is offshore.

Mr. QUARLES. Any other comments?

Mr. MULL. Yes, I'm Gil Mull with the USGS. I'd like to comment in two separate groups, one concerning first the Noatak and Cape Krusenstern proposals, and then later on the Kobuk. As Ron McIntosh has pointed out, there's considerable hazard in the use of these sort of statistical studies that are based on very limited information. I won't repeat the figures that I submitted earlier for the southern foothills of the Brooks Range subprovince from the Resource Appraisal Group, other than to emphasize that relative to the more northerly portions of the North Slope, they're considerably diminished. Certainly, we cannot categorically say that there's no potential whatsoever. But by and large, with the appraisal that the Resource Appraisal Group made and I think it might be agreed upon by at least some of us who have worked along this portion of the area—the resource potential for hydrocarbons within the Noatak Preserve and within Cape Krusenstern would be relatively low. I think we would expect that what resources would be present there would be small accumulations.

On the other hand, I would like to address another potential that is in this area. Specifically, the Delong Mountains are a very significant geological study area. It's perhaps one of the most unique areas in Alaska for the study of structural processes. As have been pointed out, there are many thousands of sedimentary rock exposed in this area. These are all juxtaposed by thrust faulting, which is telescoped many hundreds of miles of rock together in one pile. Also exposed in this area are portions—or rather extensive areas—Siniktanneyak Mountain, Misheguk Mountain, the Avon Hills are types of igneous rocks that are usually found or normally present only at depths of several tens of kilometers.

But here, this portion of the western Brooks Range, they're exposed on the surface in an area north of the tree line along with the associated sedimentary rocks in areas which they are beautifully exposed. It's a unique area for the study of geological processes and particularly processes that are involved with thrustal deformation insight as to how the Earth's crust—the Earth's surface is formed. The point that I'm trying to make is that access to areas of this type for basically scientific studies and also studies that would relate to the economic potential of the subsurface areas north of these reserves is very necessary. These are interesting areas for scientific study for geology and they might be for wildlife and botanical studies. Turning to the Kobuk area, the 1975 Resource Appraisal Group in the USGS evaluated what they termed negligible hydrocarbon resources for this portion of the Kobuk Valley. I think, on a subjective basis, that many of us might expect that the potential might be more offshore than in the Kobuk Valley itself. Again, these are disputes and debates that could range on and on within the geological community.

Mr. QUARLES. Any other comments?

Mr. MCINTOSH. Ron McIntosh. I'd like to make one further comment in regard to the two wells which were mentioned which were drilled on either side of Kotzebue Sound. That is correct. They are drilled within the geologic province which I would call the Kotzebue-Selawik Basin as distinct and apart from the Noatak-Chukchi Sea-Cape Krusenstern, which is a separate and distinct geological province.

Mr. QUARLES. Yes?

Mr. WICKES. Jim Wickes, Department of Natural Resources. The extent to which Secretary Andrus' Noatak proposal overlaps with this Overthrust belt to the north, according to our information, is roughly 138,000 acres. This area generally ranks in the 4th level on our scale of 10. within the Kobuk park proposal, our assessment indicates some 660,000 acres of land existing there in an oil basin sort of situation. However, it ranks in the bottom half of the State's assessments.

Mr. QUARLES. Anything else on fuel minerals?

Mr. FIELDS. Yes, Ed Fields, Alaska Mining Association. Along the Kobuk Valley, there are a number of small isolated coal occurrences which of itself don't constitute really a major resource, but they could be extremely important for the native villages for the local use.

Mr. QUARLES. Yes?

Mr. BIGELOW. Yes, Mr. Bigelow from Alaska Miners Association. On the North Slope, also, there are some very attractive quality-wise, at least, oil shales. They go for hundreds of miles across the range and we went up and took a brief look at them, sneaked a look into the preserve some years ago, and that in there is 120 gallons per ton or more and this is very high quality oil. Now, we heard at that time, the USGS rather discounted these things—said they were too thin. Well, with that kind of gallonage, you don't need more than 4 or 5 feet of them and these things are scattered over hundreds of miles and they happen to coincide with a belt that I'm going to talk about a little later, the Red Dog belt, but it looks to me like somebody should look into this and perhaps a little optimistically rather than jumping to conclusions.

Nonfuel Mineral Resources

Mr. QUARLES. Any other comments on energy? We'll go on then to nonfuel minerals. Yes, USGS?

MR. GRYBECK. Donald Grybeck, U.S. Geological Survey. Again, I'd like to refer to the map on the wall and I would assume that people would be talking about Red Dog, so I won't talk about it in any great deal. With a very few exceptions, the only work up there that we're aware of is our work except around the Red Dog area—level II work, reconnaisance work. The number seven up there, the little pink area there. There's some gold placer production along Squirrel Creek that's been known since almost the First World War. There's one consultant recently that estimated there may be as many as 22 million grams of gold remaining. That seems a little high. Area 4 is just above that. Scattered occurrences of copper, zinc, and barite. At least one deposit was drilled, a copper deposit, and there's one substantial barite deposit in there. Again, most of the work predates 1971. There's been little modern work in there. The purple areas—there's quite a number of them. They've been referred to by Gil for their scientific value. I can see at least—Misheguk Mountain, Avon—there's a whole line of these things through there.

There again, there's ultramafic, mafic rocks, scientifically very interesting. These type of rocks commonly have chromite deposits, nickel deposits, platinum deposits, and copper deposits. They've been almost untested as far as any detailed work. Now, on that particular map, I haven't tied up area 5, which is the area around Red Dog. There's two blue areas. There's one which is area 5. That is the area around the Red Dog deposits on the Wulik River. There's recently been an industry, apparently very large deposits, the geology favorable—the geology extends quite an area there. It's all that blue area. There's a 90-percent chance of 5 of these things, there's a 50-percent chance that there's 8 of them, and there's a 10-percent chance there's 16 of them. Last summer, work in southern NPRA by U.S. Geological Survey and the U.S. Bureau of Mines indicated similar types of mineralization extends along the southern boundary of NPRA and into the Noatak area. The work is very preliminary except in one particular deposit on Drenchwater Creek where substantial mineralization has been found. There are no numbers given on that yet, but it does appear to be similar to Red Dog. If I were to redraw that map at the present time, I would put that belt as continuous across there and as I have said previously, it may extend all along the north flank of the Brooks Range. I have no remarks on Cape Krusenstern. The Kobuk area—or the Kobuk Valley area—most of that is level II. The most significant potential deposit and at this point, it's little more than a potential deposit, is that western extension of the Copper Belt.

You can see that a Copper Belt takes a bend to the south—quite an extensive area in there, but there's been almost no work, either by us, other than some geochemical work, and almost no work by industry. It's, of course, been closed for many years to industry. That concludes my remarks.

Mr. QUARLES. Yes?

Mr. JANSONS. Uldis Jansons for the Bureau of Mines. I'd like to run through the different withdrawal areas one at a time. the general problem with discussing mineral deposits within the whole withdrawal area is that there hasn't been much recent work done. Up to probably about 1960, most of the work that has been done was done by local prospecters. If you couldn't get the data from them to put on your map, you just don't have it. In 1960, the first regional company—industry—sophisticated exploration program was conducted. This regional program led to the discovery of three major base metal deposits which have been followed up subsequently. But since the followup in about 1965, there's been no other work done in the area, so the best you can do at this stage is to try to relate commodities and the rock types in which they occur.

Within the Noatak River area, there are several mafic-ultramatic intrusives, especially in the area of the Avan River, Misheguk Mountain, Siniktanneyak Mountain, and Asik Mountain. All these four intrusives are known to contain chromite in variable amounts. These units also contain platinum and in a prospecting program in 1965, platinum was found in minor amounts on the Avan River. The possibility of platinum deposits within the mafic-ultramakic intrusives still remains to be evaluated.

The second rock types which are of interest for prospecting are the carbonates and clastic environments. These are shown on the map in blue and fill much of the area of mineral potentials shown there. The type of deposits that have been found in the carbonates include the Omar prospect, which is a major copper occurrence. It is very similar to the occurrence at Bornite where several million tons of high-grade copper have been developed underground. Just east of the Omar prospect is the Frost prospect, also discovered in the 1960's. This is a general area at anomolous zinc values in the rock. There are sphalerite deposits and extensive zones of barite mineralization. In addition to the zinc and barite, there is also flouride and minor amounts of galena. Other occurrences within this sedimentary sequence include copper deposits along the Agashshok River. These include both copper in carbonates and also zinc in schistose rocks.

In addition to the mafic and carbonate rock units, several areas with several types of placer deposits are possible. The previously mentioned Squirrel River deposits have been mined for some time. In addition to the Squirrel River deposits, there is gold on Timber Creek and on Klery Creek. In the Eli River, placer tin has been found, but the lode source of tin has not been located.

One other type of geologic environment is the sequence of volcanic rocks at Naiyumerak Mountain. These volcanics are known to contain variable amounts of copper, generally small as we know them now.

Literature sources indicate that within the Noatak River withdrawal, there are 21 sites of mineralization in bedrock, 10 placer deposits—and some areas that contain barite. The bedrock source of the barite has not been found. Oil shale is reported to be present on the Aniuk River.

In the Kobuk Valley National Monument, going through the same procedure there are placer deposits of gold in the headwaters of the Salmon River. These were drilled in the period from about 1947 through 1951. The amount of gold found is not known. It may be of interest to point out that the drilling equipment for sampling the placer gold in 1949 was brought in by dogs. This gives some idea of what a problem it was to work in this area before we had reasonable aircraft to bring in equipment. Also, in the Salmon River area are about a half-dozen known copper lode deposits and one lead zinc deposit. The extent of these has never been really detailed.

As we've heard before, the schist belt rocks continue west from the Ambler district into the proposed Kobuk Valley National Monument. These rocks are known to contain very large concentrations of zinc, copper, lead, silver, gold. In the Kobuk Valley monument area, geochemical data provided by the State of Alaska indicates anomolous metal concentrations in stream sediment samples. The values of the metals in the stream sediment samples are similar to those found with known mineralization in the Ambler district.

One granitic intrusive is known to contain a sizable area of anomolous lead, zinc, copper, and flouride mineralization. Also, minor amounts of uranium minerals have been found in this geologic environment.

Within the proposed Kobuk Valley Monument, tallying up deposits on record shows that there are 10 lode-type deposits, and 1 placer deposit. These are minimum numbers. In the Red Dog area, at the northwest end of the proposed Kobuk Valley National Monument, there is a sequence of carbonates, cherts, and clustics. A major lead-zinc occurrence exists here. It was sampled initially and reported in the literature only in 1970. Later work in 1975 showed that the area of mineralization covers at least 9,000 feet by 35,000 feet. Geologically, the trend extends both to the west and to the northeast. Since 1975 numerous claims, probably several thousand, have been staked where this trend extends westward out of the withdrawal area. Bureau of Mines reconnaissance to the northeast led us to the various zones of similar colored mineralization. Grades found to the northeast so far are fairly low except at the previously mentioned Drenchwater Creek mineralization in NPRA, which is on the same geologic trend. Grades here go up to 31 percent zinc and 8 percent lead, with 5 ounces of silver per ton—not bad grades for anywhere.

In the Cape Krusenstern area, the data is really scarce. Minerals data are in the form of comments from prospecters. I'll have to use the same terminology that was used. The problem with these comments are that the locations cannot be defined specifically. There are four types and four areas of mineralization. There's placer gold in an area 25 miles northwest of Kotzebue along the shore, which may or may not fall within the Cape Krusenstern area. There's a ledge of galena reported to contain $35 per ton in gold. At the old price, $35 per ounce of gold. It is someplace along the divide west of the Noatak between the villages of Noatak and Kivalina. A more recent discovery of lead and zinc is the headwaters of Rabbit Creek. There is another report of lead silver but its location is unknown. That's all I have.

Mr. BIGELOW. All right. To show the seriousness with which we regard the Brooks Range, I might say that right now, we're consultants of a group that is working out to the west of Red Dog, plus we're working in the Ambler district and we're also working over to the east in the Wiseman enclave and we expect this year on behalf of our clients to commit approximately $12 million to minerals exploration and development programs in Alaska. Over 200 people will be involved in these programs. Approximately 7 million of this, at the minimum, will be consumed in the Doyon and NANA regions of the Brooks Range and we'll also have over 150 people employed in these regions in the small open to entry enclaves that remain available to us.

Our commitment, of course, is only one part of it. I don't know what the total commitment is going to be this year in Alaska. We've extrapolated what we know of other companies and ourselves and we came up with $70 million for 1977 and we expect that to top $100 million if other peoples' growth is anywhere near ours. And a large percentage of this is going to go into the Brooks Range. Expenditures in recent years in the open to entry lands in the Brooks Range have reached up to $25 or $20 per acre if you spread it out over the entire area. On the other hand, the expenditures in the 19 million acres of (d)(2) lands is roughly, we figure, probably less than 2 cents per acre.

For that amount, you can't fly over it. Some people have said it's as much as a few tenths of a cent per acre, but still you can do anything with that to look at large blocks of land, so there has been no real appraisal in the Brooks Range. We were contracted by the Bureau of Mines to conduct a minerals appraisal of the 19 million acres for $300,000. This was, I believe, it's either 1.6 of 0.16 cents per acre. Now, obviously, the Bureaus realized this, also, and so the program resolved itself into spot examinations of a number of prospects across the range. The USGS has done some work up there, too, but we don't think anybody knows anything about mineral potential in the region except that what you can infer from the huge potential in the very small areas that are open to mineral entry and it must be enormous, perhaps one of the world's great mineral belts—it certainly is one of the world's great mineral belts.

To go to the Red Dog area, I've got with me, which I'm going to give to you people, is the Bureau of Mines' press release on Red Dog and also a press release from General Crude Oil Co., who along with Houston Oil and Minerals, has the properties to the west of Red Dog which were discovered after the press releases on

Red Dog. Over 8,000 claims have been staked in the 2-year period following the Red Dog press release in the open to mineral entry enclave in the Wulik River and it's shown in yellow on that map up behing your table there.

What's shown on there, also, are a few red dots, including Red Dog, which are some of the more attractive occurrences of which we are aware of at the present time. The fact that we intend to spend several million dollars this year in that one enclave should attest to the fact that the Red Dog trend is considered quite attractive. Other people are also working in there and committing substantial resources. Now, the trend that I've shown on there is outlined in blue and this is the Red Dog black chert, black shale trend and Red Dog is just on the east side of that yellow patch up towards Kivalina and Noatak and this thing goes whooping off across the north and over there in the central part of the map, up where it says Red Dog trend, in that area is where the USGS reports their Drenchwater find. Joe Rizika, another fellow on our staff, and I went up there some years ago and we saw red hills and creeks in the Red Dog type lithology that looked just the same as Red Dog turned out to look to us later when we saw it. Of course, some of it's on Petroleum Reserve and some of it's on the (d)(2) lands up there, so it's all off limits. We did nothing about it. Also in that belt, we recognize oil shale potential in there. We think it's a very attractive oil shale potential and, if the opportunity presented itself, we would be up there with drills in quite a short time. Barite is also common along that trend. In fact, there may be some of North America's greatest barite reserves in the area. We found barite layers up to 90 feet thick that may go for a mile or more and then they're just underlain by what appears to be more barite.

If you're talking about oil exploration, either in that area or immediately to the north of the open lands there, well, that could come in handy. Obviously, we're concerned about transportation in the area there. We may go to the sea or we may have to go east towards Bornite and on out that way. One way or the other, we must have transportation. Transportation is pushed into the Wulik—into the area of that open lands, say, 50 or 60 miles in there, that will open up the next stretch and the intrastructure will just carry you on across through the north part of the range, which would also, I would assume, be quite a considerable importance to people in search of energy resources. At Red Dog, mineralization is exposed over 5,000 by 3,500 feet, at least, and this is right at the prospect itself. This—near the edge of the (d)(2) lands, but it's on them. The target itself, the Red Dog target itself, if you just talk about the one little properties cluster, is probably 3 to 7 or 8 square miles with some very impressive geochemical values in there that have to mean metal sulfides. And the whole thing is wide open going to the northeast. In fact, most of the favorable ground is in (d)(2) lands and what we're very likely looking at is one of the world's major lead, zinc, silver, cadmium districts.

Now, I've also encircled some other areas there on the map as favorable that I'm not even going to mention, but I would like to just skip along here a little bit and the comment often comes up, "Well, why don't mines in Alaska—aren't they good enough? Aren't they as good as they are in Canada?"

Well, I just want to take a brief little trip across Canada from east to west. The first one is Asbestos Hill on the Angava Peninsula near Hudson Bay. The mine is further north from tree line than the Red Dog. Ocean transport is available for only 100 days per year. A 50-mile lode was required, which is approximately the distance that Red Dog is from the sea. No Government support was provided for this mine. Ore reserves are 19 million tons. Capitol investment was $100 million. The operation is very profitable.

Now, the remote one is the Minisivik Mine. The Minisivik Mine is really remote. It's seventy-three degrees latitude on the north tip of Bafin Island. The shipping season is 60 days. Concentrates of 125,000 to 150,000 tons annually are shipped, despite this very short season. Total cost of the project is $67 million. Reserves are no more than 7 million tons of 15 percent combined zinc lead with a silver credit. Now, these reserves of at least 15 percent combined zinc-lead lower than what we would expect to see for much larger tonnages in the Wulik area and as indicated from the press release which I have right here and also for the deposits in the Ambler district. The Canadian Government earned an equity position by contributing assistance valued at $17 million—they paid for it—they paid for their equity. The climate and ice problems are far more severe at Minisivik than at the Wulik region. The ore body is much smaller than the exploration potential target in the Wulik and, of course, the district prospect of Wulik is something that is not known to exist in Minisivik.

The Black Angel Mine in Greenland—this is a bad one, too. It's latitude 70 degrees in an extremely remote area. The deposit occurs in a cliff 1,500 feet above the sea. The town is across the fjord and access is by an aerial tram. Capital costs were $44 million, exclusive of working capital. Reserves were 4.5 million tons of approximately 20 percent combined lead, zinc. Now, on the Wulik, what we're envisioning are ore bodies of 20 millions tons or more at perhaps 10 to 20 percent combined lead zinc with silver. As usually happens at new mines, reserves have been added at Black Angel Mine. Then coming across toward the west in Canada, we come to Pine Point, which is one of the big ones. Extremely successful—10,000 tons per day lead and zinc operation on the south shore of Great Slave Lake at 61 degrees north in the Northwest Territories. 510 miles north of Edmunton and 1,400 miles by overland from the smelter at Trail, British Columbia. The key to the opening of Pine Point was an enlightened Government attitude. The Government financed rail construction and the pay back has been taken care of by a surcharge per ton on top of normal freight rates. The company has had to guarantee a minimum of 215,000 tons of concentrates per year to insure the Government came out agreeably, and it has. Since 1965, the surcharges have amounted to $15 million in addition to $44 million in freight revenues. The earnings record on this venture have been commensurate with the high risk. Nearly $100 million in the last 3 years.

A number of people positively affected by the mine number in the thousands. The government has taken in $75 million in revenues, which I would think that anyone looking out here to the west in an area where there's probably vast number of people unemployed right now would be thinking quite a bit about the people approach to this. The ore reserves, by the way, are 39 million tons—or as of 1975, there were thirty-nine million tons at 7.4 percent combined lead and zinc, which is not comparable to what we're seeing here, and yet this is an extremely profitable mine.

Then, finally, we get into the Yukon at the Pharoah Mine. This deposit is 230 miles by road from Whitehorse, which is 110 miles by rail to Skagway in the Alaska Panhandle. The concentrates are shipped from Skagway to Europe and the Far East. Several deposits have been discovered to form a district cluster. A $42 million loan was arranged with four banks to start things. Reserves are about 60 million tons at 9 percent combined lead zinc with silver as of 1967 in three bodies. This is when they were starting up. A power line was strung in from Whitehorse and the concentrator started up in 1969. The town of Pharoah was built for 300 employees plus their families. Other employees were involved at Whitehorse and Skagway. Total spent was $100 million. Production is at 10,000 tons per day. Earnings over the last 6 years are $82 million. Long-term debt is down to $5 million and $76 million in dividends have been paid and the second largest community in the Yukon established. Millions of dollars in taxes and royalties have accrued to the government in addition to individual income taxes.

The only other one I wanted to mention is Clinton, which abuts the Alaska border. We've reached the magic political boundary when we get to Clinton and it's another asbestos mine. And it's really bad. It's located in a very remote land locked area, 140 miles south of the Arctic Circle, 8 miles east of Alaska, and 50 miles north of Dawson in the gold-rich Klondike. A town was constructed at the asbestos mine for 300 employees and their families. Trucks carry the product to Whitehorse 400 miles to the south, then via the railroad to Skagway on the Alaska Peninsula. The Canadian Government contribution amounted to $2.8 million for roads. The capital investment was $26 million and annual sales were $23 million in 1974. I think this demonstrates that these types of things we're talking about over here are in the ballpark and they're ready. There's just one other little note that I took here was that we have this large park here in the Brooks Range. I would assume that we don't want just a few wealthy people to see it, but all people to see it. So I assume that if we took 10 percent of the population—and this relates to energy—10 percent of the U.S. population and assumed that's 20 million people and we had them come north in camper of Fiats or whatever, that would be 10 million camper trips per year. That figures out to 10—I don't know how many gallons that is. Two hundred and fifty million barrels of fuel to bring 10 percent of the people up there for one look at the parks and that is 250 days of the pipeline production. Now, if we want 10 percent to come every year, that is what the Alaska Pipeline is built for. That's all I have. I think somebody should look into that, though, if we're talking about energy resources here in the gas tanks.

Mr. Belous. I have one or two brief comments to make. In defense of the last point, though, I think it would be worth pointing out historically that Yellowstone was once remote, too, and a place where some who were opposed to the establishing of the world's first National Park said, "Who would ever go there?" and today, we have almost 4 million people a year going there. Perhaps too many, in the eyes of some. But one thing I'd like to point out as a sort of a point of perspective as to these schist belts and occurrences of gold, mining claims and the like. I'd like to point out that some of it is really unrelated to the Kobuk Valley. No. 11, Klery Creek, the gold claims there in the—I guess, western above the schist belt occur outside the boundary and I hope that was made clear here. It wasn't to me. But they do not conflict.

Mr. JANSONS. Klery Creek itself, I think, is in the (d)(2) lands. The Squirrel River is not, though.

Mr. BELOUS. I think we can clarify that when Russ Chadwick gets up here. I'd like to put him on base here to talk to the Klery Creek claims themselves and also to the value of the claims that do occur inside the boundary, since we have made an assessment of them. Second, the Kobuk Valley lies in this schist belt, or copper belt, that is, according to the latest USGS map, some 500 miles in length, east to west.

The amount of that belt occupied by the Kobuk proposal, that is the administration proposal, is something like 11 to 12 percent. If I read the USGS recent publication correctly, it is not of the highest potential in that entire belt. For example, the potential as compared to areas just to the east is lower by, if I can use the comparison, the factor of five. The potential for the area within the Kobuk is 90 percent chance for for discoveries of 1 to 3 deposits, whereas further to the east, it's—90 percent chance of discoveries of up to 15 deposits. I'd also like to point out what geologists have pointed out in the past and that is that within this enormous belt, there are pockets—known pockets and we already have cited a few here in preceding testimony: Picnic Creek, Arctic, Bornite—they occur in a belt sometimes referred to as the Kalurivik Arch, which is a belt within a belt, and that arch has some discrete dimensions. It's about 80 miles long, running from Kalurivik Creek over to Picnic Creek, but I think it would be worth pointing out and I'm sure USGS could do this much better than I—whether or not the entire schist belt of some 500 miles is made up of this kind of potential that you find under Picnic Creek. Evidence is that it is not and I think that perhaps should be made clear somewhere along the way. Also—and it's my last point before I'd like to turn it over to Russ Chadwick here to indicate how the mining claims have panned out, if you will, is that the schist belt crosses the Kobuk proposal—the Administration's Kobuk proposal directly across—overlapping the caribou migration routes that were cited as so critical to not only the ongoing subsistence needs of the people, but the historic usage of these areas.

After Russ Chadwick is finished, I would like to solicit comment from Peter Lent with the U.S. Fish and Wildlife Service on the kind of impact to caribou that the sort of paraphanelia, accoutrements, and railways, perhaps a road, facilities, transportation corridors linked to copper or mineral development would have on caribou in general and specifically in critical bottlenecks like the Hunt River Pass, the Kaliguricheark Pass, the Nuna Creek Pass and so, with that, I would like to turn over, with your permission, to Mr. Chadwick and let him give a rundown of the current claims assessments within the Kobuk.

Mr. BEVINETTO. I would like to ask for just a point of information, clarification to the agencies that have done the mineral evaluation studies. To what degree have they done the studies consistent with wilderness studies in the lower 48 on the areas that have been proposed for instant wilderness?

Mr. GRYBECK. I'm Don Grybeck from the U.S. Geological Survey. I have worked on a wilderness area in Southeast Alaska, Tracy Arms-Fjords Terror. I'm now involved in the Glacier Bay studies, so I do have some idea of what level of work has been done on the wilderness areas. I would say that western park of the belt—it isn't even remotely close to any wilderness studies that have been done in the past. The central third of the belt is probably better. That's where the best estimates come from. The eastern end of it may be close, but I don't think quite as good.

Mr. QUARLES. Thank you. Bureau?

Mr. MOWATT. Tom Mowatt, Bureau of Mines. Again, with respect to the degree of assessment that is represented in wilderness study, with respect to delineation of mineral resources, we do feel that perhaps in many instances, this has been somewhat less than adequate in detail. And I think I'd like to note in passing that the comment that Mr. Grybeck just made with respect to where the greatest degree of information does exist is, indeed, within that enclave of open ground and that if a sufficient degree of exploration had been pursued in the two other areas east and west of that, you might presumably expect to see a similar level of information available and presumably similar reserves.

Mr. QUARLES. Thank you.

Mr. KAUFFMANN. Well, may I make just one point while Mr. Chadwick is——

Mr. QUARLES. Sure.

Mr. KAUFFMANN. I believe the Red Dog prospect, although it's on (d)(2) land, is outside the boundaries of the watershed of the Noatak River.

Mr. CHADWICK. Russell Chadwick, consultant to the Park Service. I don't have very much to contribute to this conversation because at the time the study area involved was simply this Kobuk dunes area and the lines were pretty carefully drawn and do not include, like, the Klery Creek and this can be seen on that map, nor does it include the then-known showings and claims on the east side of things, along the schist belt.

So that all that was on the record at that time were three properties and none of them are important in any of this discussion. They were old properties. Two of them staked and then dropped the next year. One of them—the third one clearly not legal claims. One claim for 4,400 acres or something like this and so that within that boundary, there were three units and none of them were of interest or importance.

Mr. QUARLES. Thank you. Did you say you had one other person you wanted to come forward?

Mr. BELOUS. Dr. Peter Lent.

Mr. **Lent**. The only remarks I want to make apply equally to the discussion of transportation corridors, which is really the gist of what I want to talk about.

Mr. **Quarles**. In that case, if you would, why don't we wait. I didn't realize that fully.

Mr. **Smith**. I'm Dave Hederly Smith with the Alaska Miners Association. I've prepared a statement on this and two-thirds of what's in here has already been said, so I'll just drop it off and we can save some time.

Mr. **Quarles**. Great.

Mr. **Smith**. I'll speak specifically on the Cape Krusenstern area. On the comment of have these areas seen as much study as wilderness areas have down south—I was in Washington when the Alpine Lakes Wilderness Area was being studied. At that time, area-wise, we're looking at about the same area of ground as we are in Cape Krusenstern—the Alpine Lakes has maybe a hundred individual prospects that were examined by the Geological Survey and the main work that's being done in Cape Krusenstern is another ½ million acres.

The geochemical program that has been run here has 87 samples, so in the same area, we're looking at 87 individual reconnaissance samples, 1 per 9 square mile area, as opposed to on-ground evaluation of about a hundred prospects in Washington. There are not many known prospects in Cape Krusenstern. This is partially because of a lot of tundra in here, certainly. The white on the map is tundra, the colored units are rocks and so forth. There's a lot of tundra and the area, of course, has been withdrawn since there's been any real interest by industry in this particular part of the State. Specifically, there's some chromite possibilities, actually over here in the—I have here the Noatak National Arctic Range or whatever we're calling it now. There's some chromite potential here. There's some chromite geochemistry around Tesurik Mountain in the southern part of the Cape Krusenstern—not really much. There's tin—there were some tin placer claims based around Noyaruk, here in an area that's proposed on some proposals. They've since lapsed. There's no acid intrusive in the area. There probably is not any really significant tin potential. Now, the main potential here is in lead, zinc, silver mineralization. The red dot here is the Rabbit Creek occurrence which the Bureau of Mines mentioned. It's in rock mapped as Mississippian (Devonian) Endicott group. Now, what I've done here is this is a compilation of Geological Survey mapping—of their reconnaissance mapping. I'm sure they'll be the first to admit that. I think it's pretty good mapping.

I'll give them that much credit. This here is mapping just to the north of the Red Dog Creek area. The Red Dog Creek prospect is here. The red dots are various other prospects in the area and what we have here is this ground occurs in a window through a thrust, the blue Mississippian—or the blue rocks are Mississippian carbonates, the brown here is Mississippian Devonian Endicott group. They're plastic sediment. The yellow—I don't think anyone knows exactly what they are. They're Triassic through Mississippian age rock. They include some of this and some younger sediments, also. The yellow has not been mapped down here. There's no reason to suspect that it isn't present here. We have a thrust fault here which has not been mapped. It is quite likely—I shouldn't say likely—it's quite possible, although it is supposition, that that same terrain extends right down through here and that's what Mr. Bigelow has shown here on his map. The Rabbit Creek occurrence may be similar to the Red Dog occurrence and the main potential in the Cape Krusenstern National Monument is in the Mulgrave Hills or the northern portion, I believe. We certainly should see some sort of onground study before they're included in the Monument, I think. One other thing which the minerals industry is sorely going to miss if the Monument is established—there's a potential dock site right here. this is the only location between Kotzebue and Point Hope where bedrock reaches the coast. I've talked to people who have flown this looking for dock sites. It appears to be the only potential deep water port. I don't know if there's any hydrographic data on it. Everything else here is beaches. It's going to be flat. It's going to take a long wharf and dredging if, indeed, ores are to be shipped from these prospects if they are developed. And that's all I have to say, thank you.

Mr. QUARLES. Thank you. Yes.

Mr. GRYBECK. I just wanted to comment on the statistics by Mr. Belous. To make it very clear, we're talking about the shis belt—the copper belt there. Statistics are 90 percent chance, 50 percent and 10 percent. In the central ⅓, there's a 15 percent—there's 15 deposits in the 90 percent category—well, 90, 50, 10. The numbers go 15, 20, 30, and the—in the eastern region, it's 3, 8, 30 and in the western region, it's 1, 5, 20. the probability is lower in that western region because we know so much—so much less about it. Effectively, the 10 percent—there's the same chance in all areas. It's mainly a relfection that we know so little about those two areas. Also, the most of the deposits do lie along the Kolorovik Arch, but probably has little to do with the deposits at all. Probably a much later feature, one of those things.

Mr. QUARLES. Any other comments on mineral resources? Yes.

Mr. MCMICHAEL. My name is Roy McMichael, the Alaska Miners Association. My company, Chemico America, Inc., has been actively engaged in mineral exploration in the western Delong Mountains and the Brooks Range since September of 1975. To date, Chemico America has spent on the order of $1 million on mineral exploration in the Noatak region.

The exploration has determined that the Delong Mountains may contain very large mineral reserves of lead and zinc with associated major concentrations of silver and cadmium. This statement is based on drilling results of Chemico American and General Crude Houston Oil and Minerals on (d)(1) land and field evidence collected by the U.S. Geological Survey and the U.S. Bureau of Mines on adjacent (d)(2) and NPRA lands. The mental deposits occur within a flat shale and outcrops throughout the Delong Mountains. Mineralized black shale has been sampled by various geological parties throughout a 150 mile belt that begins about 40 miles west of the Red Dog on (d)(1) lands, turns northeastward across the northern part of the Noatak Ecological Preserve, continues to the east of the Drenchwater showings on NPRA lands. No metal concentrations of probable exonomic quantities are at Red Dog, the

General Crude Houston Oil discoveries, and Drenchwater. In addition, Chemico American has drilled two other mineralized areas in the Noatak region. I'll overlook some of this. It's sort of repetitious to what's already been said, but Chemico American, Inc., holds 2,000 Federal mining claims west of the Red Dog on (d)(1) lands. HON General Crude has approximately 8,000 claims. During 1977, over 3,200 feet of drilling was completed. The results indicate additional mineralized areas are present. However, further drilling is required to better define the areas. Chemico American has determined by detailed geological mapping and extensive reconnaissance mapping that the mineralized shale belt continues for several tens of miles into the northern part of the Noatak Ecological Preserve.

It is recommended that the western edge of the Noatak Ecological Preserve along the (d)(1) boundary and the northern edge south of NPRA be open for mineral entry. The area would be a corridor two to three townships wide involving approximately 800,000 acres of land and would include a large portion of the black shale belt. It is also recommended that the mineral potential of the entire Noatak National Ecological Preserve be thoroughly re-evaluated before the land is closed forever. The presence of large amounts of valuable metals within the preserve is a reality. It is also a reality that our present supply of strategic minerals, like our oil reserves, is finite. We cannot afford to lock away our future metal reserves. That concludes my comments.

Mr. QUARLES. Anyone else on minerals?

Mr. GORDON. OK, first, just one point. In regard to the Squirrel drainage, which is the eastern part of the overall Squirrel river drainage, the mineral—development of the mineral potential must take into account the fact that recently there have been 6 peregrine falcon nests discovered. It's one of the endangered species. I simply wanted to repeat what perhaps has been said before, but I haven't heard it said. A number of these claims in the so-called schist belt have been staked before the (d)(2) withdrawals, but anyway, the mineral community had the most interest in those areas.

An area of geographical interest has been pretty well defined by the Red Stone River on the west and the Reed River on the east. I'm not questioning potential, particularly in Belt 12A, USGS, which extends a little bit further east, but of 500 miles along the south side of the Brooks Range, the anomolies known so far that are major have all been within that belt. The Red Stone is just east of the east boundary of Kobuk, and the Reed, or particularly above the Reed, is just at the edge of the west boundary of that enclave in the Gates of the Arctic that has been made so that the minerals could be developed and it seems to me this is perhaps the classic example in the State based on known information where we can have our cake and eat it. We can have a proven area of minerals—100 percent, that proven area, open to mineralization and we can have these two parks with the boundaries of the Gates somewhat compromised to allow for the Picnic Creek site.

Mr. QUARLES. Yes?

Mr. OVENSHINE. Tom Ovenshine, Geological Survey. One of the previous speakers said the Geological Survey field studies cost a few cents an acre. I'd be remiss if I didn't correct that. They're on the order of 30 to 90 cents per acre, depending on where you're working. A field study—a level three study is quite comparable to the wilderness studies done in the lower 48.

Mr. WICKES. Jim Wickes, Department of Natural Resources. The Department's statewide assessment for mineral areas in the State—areas which have some mineral potential, excuse me, rates the entire Andrus Noatak proposal as having some potential. That's 5.9 million acres of which 1 million acres fall in the top fifth on the statewide system. Within the Kobuk proposal of the Secretary of Interior, we find 1.5 million acres with some potential, 275,000 acres of which fall in the second tenth. Cape Krusenstern has much lower potential relative to either of these other two units, some 330,000 acres ranging in levels four through seven.

Mr. SILVER. Jim, where are those located?

Mr. WICKES. For all of those areas?

Mr. SILVER. For Noatak and Kobuk.

Mr. WICKES. Yes, for Noatak, it's basically the belt—the Red Dog prospect trend that's been identified up there.

Mr. SILVER. And Kobuk would be the schist?

Mr. WICKES. Kobuk would be the schist.

Mr. QUARLES. Anyone else?

Mr. BIGELOW. If the Survey has spent, say, 50 cents an acre, that's $9½ million in the Noatak and the Gates of the Arctic—in that area in the field, I assume they mean, not overhead. And I've probably been there longer than anyone else in this room—continuously every year since 1959 I've been up there. And I've been all over those hills and it's very seldom that I saw anybody, even before the Alaska Native Claims Settlement Act passed except other mining people. Now, I've——

Mr. QUARLES. I don't think we have a problem here. I think what he was saying was just when they do the field studies, that's what they're doing. I don't think he claims they were doing field studies throughout the Noatak.

Mr. BIGELOW. Because they aren't done yet. That's all I wanted to get clear.

Mr. OVENSHINE. Tom Ovenshine, Geological Survey. Wouldn't it be more proper to ask where we've done the level III studies?

Mr. BIGELOW. I'm sorry, yes.

Transportation and Access

Mr. QUARLES. Anything else on minerals? OK, then if we can turn to Transportation and we have a prior reservation for the first spot.

Mr. LENT. Peter Lent, Fish and Wildlife Service. I want to talk generally about the potential impacts of transportation corridors on caribou and then specifically about the proposed corridor down the Kobuk River Valley. Before I do that, I have to make a few general remarks about caribou in northwest Alaska that I don't think have been made yet. We've had various speakers address the importance of each of the proposed units to caribou. Nevertheless, it's necessary to emphasize that the major winter ranges for the

Western Arctic herd, a large portion of the summer ranges, and the entire calving area for this herd lie outside of any of the proposed (d)(2) areas. The (d)(2) areas generally form a chain separating major wintering ranges from the calving grounds and summering areas on the North Slope. There's been a zone of important winter range extending from approximately Buckland to approximately Bettles, a known crescent, including the Waring and Lockwood Mountains and other uplands rich in lichen ranges and this area normally receives use by anywhere between a ¼ and ¾ of the population during the wintertime, depending upon the year.

Now, we can talk a little bit about some of the problems which have arisen elsewhere where transportation corridors have intersected caribou migration routes and particularly winter ranges.

In Scandinavia, for example, where a road and parallel railroad cross through the range of the wild reindeer herd, winter ranges to the east of the corridor were not used for several years. Finally, animals began to cross the corridor, but ranges west of the corridor were and have continued to be overgrazed while ranges to the east of the corridor have been under-utilized. In addition, mortality of both domestic and wild reindeer in Scandinavia, due to roads and railroads, particularly where they transect areas of deep snow cover, is extremely high, numbering in the thousands each year. Problems have also recently started righ near where powerlines are located in that there is a reluctance of reindeer herds, including domestic reindeer, to cross under powerlines. Finally, severe problems have arisen where snow fences are in place along roads used in the wintertime to regulate drifting, adding to the problems of crossing the corridor.

Now, I want to read very quickly a short paragraph from a report written by Dr. Cameron and Mr. Whitten of the Alaska Department of Fish and Game for the joint State, Federal, fish and wildlife advisory team concerning the impacts of the transAlaska pipeline and associated haul road. I'm reading this because I think you'll see they contradict quite strongly the personal observations reported a little while back by the speaker from AOGA. In their summary, they state, "Caribou associated with the pipeline corridor described for 1975 appear to increase during 1976. Calf percentages determined from haul road surveys continue to be lower than those obtained from comparable aerial surveys, particularly during spring and summer, and this is because cows with calves are particularly reluctant to enter the haul road pipeline corridor and are susceptible to disturbance in other segments of the population."

To continue, "Sustained caribou avoidance of the Prudhoe Bay area was noted and various abnormalities in group composition were observed in several regions of the pipeline corridor. Caribou cited infrequently along the haul road and the observed rate of corridor crossings was generally lower in 1976 than in 1975. As in 1975, contact with and crossings of elevated pipe were infrequent. Results indicate that the herd is undergoing a separation into eastern and western components, each with largely independent north-south movements."

The occurrence here seems to be similar to that in Scandinavia and also in the Soviet Union that instead of having habituation, we often find that 2, 3 years after the corridor has been established, the road or whatever, youth on the far side declines. It's not necessarily an immediate decline.

Now, the Kobuk River corridor, parallel to and adjacent to the river, could not be at a worse location with regard to caribou. And I want to mention a couple of reasons why this is so. First of all, the river itself can be a natural barrier as when ice floes or thin ice exist, so therefore we have a potential for a double barrier, a natural one plus a man-made one, causing delays in movements and deflection of movements in either direction as the animals move south to the major wintering areas or north again toward the calving grounds in the spring.

This is particularly critical as is mentioned in the passage area coming down from the Hunt River in that particularly part of the Kobuk. It's also very critical and perhaps even more so since I've seen maps showing two or three different branches of corridors in the general Selawik Lake—lower Kobuk area where we have almost every year major movements coming down closely to the coast, moving into either the southern part of the Selawik Refuge and into the winter ranges to the south. An additional problem with this corridor location is that there are so many villages along the Kobuk River and this is already an area of extremely heavy hunting harvest. If anything occurs to delay movement of animals out of this area, in addition to natural factors, there will be ease of accessibility to villages. The villages in this area will increase the problems of regulating hunting. The areas to the south of the proposed corridor are areas of relatively less accessibility and provide winter ranges where the animals are not subject to such heavy hunting. I will just close by saying that, again, I mentioned before with regard to reindeer, in the late part of the 19th century, early part of the 20th century, caribou did not come down into the Kobuk drainage with any frequency. The ranges were then north of the Kobuk drainage generally. There is a possibility with a reduced population of caribou now in northwest Alaska, this will occur again. Perhaps through loss of traditions and gradual attrition of animals which are accustomed to moving to these southern ranges. It must be considered a distinct possibility that the development of transportation corridors in this area might increase the probability of animals, during this low population level, ceasing to use this area and deprive the people of the lower Kobuk drainage and villages to the south of there of access to this resource.

Mr. QUARLES. Steve.

Mr. SILVER. Are there any studies on the effect of McKinley Park Road on the McKinley herd?

Mr. LENT. Yes, there has been a study, but the results are not, as I recall, too clear cut. There is some tendency for animals, again, primarily cows, to avoid the road, but it wasn't a clear cut----

Mr. SILVER. Do they cross it?

Mr. LENT. Oh, yes. Yes, they do cross the road.

Mr. SILVER. This is why I asked the question. If there is a study similar to that available.

Mr. LENT. Of course, the use of the McKinley Park Road is very different than what we'd expect----

Mr. QUARLES. Yes, John?

Mr. **Kauffmann**. John Kauffmann, Park Service. I think it can be noted that as some of the gentlemen testifying previously pointed out mining might conceivably extend east-west along the arch or divide in NPRA of the Delong Mountains. That could conceivably bring a second corridor between the caribou calving grounds and the caribou wintering area. Am I correct there? I'd like to just quote three observations from Dr. Steven Young of the Center for Northern Studies which pertains to the ecological impact of corridors. I think it might be pertinent here because one of the first things you have to keep in mind is that when you take a piece of wilderness and put a road through it, you don't end up with two smaller pieces of wilderness necessarily. You often end up with no wilderness left at all.

Concerning the impact of construction and corridors on vegetation communities, he said—this is particularly with regard to the area around Feniak Lake in the Noatak area—"We would be remiss in not pointing out the extreme vulnerability of this habitat. The area covered is so small that it could literally be stripped of all vegetation in a few hours by heavy construction. Even recreational use could result in the extinction of many species in the course of a single summer season. Since many of the species here are not found elsewhere in the study area, it is conceivable that several species could be eliminate from the Noatak Valley by the most minimal disturbance of the shores of the Feniak and Desparation Lakes." Doctor young has also said that he feels a road, such as the haul road and transAlaska pipeline corridor, has ecological reverberations that extend about 50 miles on either side of the road itself.

Mr. **Quarles**. Any other comments?

Mr. **Fields**. Yes, I just want to comment on the study on the impact of corridors on the migration of the various herds. I think it's important to keep in mind that the period of time that this has been carried out is only over a few years. It's probably like our state of knowledge regarding mineral deposits. There hasn't really been enough time to get a full assessment of the impact and until that's done, we'll----

Mr. **Jansons**. I wanted to make a personal observation on this. I'm not a caribou man but I lived in the Yukon Territory. The government built a dirt road from Dawson to Inuvik on the arctic coast. This road crossed one of the major caribou migration routes. At the present time it presents a prime area for the Yukon Natives and others to go hunting.

The caribou still seem to be crossing that road. They haven't migrated off their general pattern, at least in that area, within this time period. It's a time period of 8 or 10 years.

Mr. **Gordon**. I just wanted to ask a question of one of the NANA representatives. Whether the Native communities in the NANA region have gone on record in relation to their concern for the impact of a transportation systems on the caribou subsistence resource.

Mr. **Greist**. We have testified, I think, when the Land Use Planning Commission was up there holding hearings on transportation corridors. All the villages testified against having any type of corridors up that way, premised on the subsistence lifestyle, again, and the caribou and they didn't want basically the renewable resources to diminish, since most people think that subsistence is really an economically viable way of life. They supplement in real small increments, cash.

WILD AND SCENIC RIVERS

Mr. QUARLES. Any other comments on transportation? Well, in that case, the next area we'll take is the wild and scenic river proposals outside of the areas we have discussed so far. I'd like to start with the Wulik and proceed in a clockwise position around the NPRA. I also hope tonight—we'll go as long as we can—and I hope we'll just get started on the Seward Peninsula. So other people must leave, we will not get to Selawik, Kanuti or Koyukuk tonight at all. I don't know how far we'll get on the Bering Land Bridge, either.

If we can begin, now. Please carry on your conversation out in the hallway. We'll proceed in the same way that we've done before on wild and scenic rivers. Instead of going through the whole list of values separately, we will simply accept any testimony which anyone would want to give on it. Again, we'll go counterclockwise and the Chair will have a little trouble pronouncing a couple of these, but we'll start with the Wulik and then take up the Colville and end with Ikpikpuk. We've heard some minerals testimony on the Wulik already. Is there any additional testimony on the Wulik?

Wulik River

Mr. GORDON. Well, I believe this is the Coalition proposal. First I want to indicate the historical background. This proposal, as some people have said—this was brought up in regard to minerals—the origin of this proposal came before we ever even heard that there war minerals up there as a result of the Fish and Game exploration for stream surveys, for fishery values and for recreation. This was, oh, 5, 6 years ago. They found that the Wulik was an outstanding float stream. It does have enough water in it to float from extremely high up in the mountains. It's an example of a short coastal stream coming out in the ocean and no stream of exactly that nature is represented in the wild and scenic river system. The mountains are not high, but they are extremely eroded. There's one canyon on the river which is runnable. The rest of it is quite gentle. There is air access to gravel bars up the river. The area has a good population of grizzlies. It's the northernmost major run for arctic char and for chum salmon. Another reason that the Wulik was chosen was the specific request from individuals from Kivalina who were concerned about the taking of that area from what they considered development incompatible with protection of the subsistence resources. So it has a very important subsistence resource value. It has excellent proven recreational value, access and it represents the type of river that is not otherwise represented in the system. S. 1500 includes the drainage. I realize now that there is considerable mineral conflict, but as far as the river itself is concerned, Wild and Scenic River Act, Dave Dapkus can address this—would not block access, it would not block the development of these minerals.

Mr. WILLIAMS. What was the conflict, Rich, with subsistence?

Mr. GORDON. The people in Kivalina were concerned about outsiders coming in in numbers and disturbing, whether they were mineral people or just outside hunters and fishermen, but primarily hunters coming in and simply taking some of the subsistence resources. There were several people in the village that actually indicated their concern about that and said, "Why haven't you talked about the Wulik." At that point, mining wasn't the issue.

Mr. QUARLES. Any other comments on the Wulik?

Mr. WILLIAMS. I have one question. Have you ever been there personally?

Mr. GORDON. I've been in the southermost drainage of the Wulik. The northern—around the Cape Krusenstern——

Mr. WILLIAMS. The southernmost drainage of the Wulik?

Mr. GORDON. The subdrainage of the Wulik which is within the area of environmental concern. I have never actually set foot on the main Wulik. A close friend of mine from Fish and Game gave me most of the information I have.

Mr. DRIVER. My name is Phil Driver. At this time, I'm going to testify on my own behalf. I live on the Wulik River about 6 months out of the year. The lower 15 airline miles coming inland from the coast will be private property which will belong to the village of Kivalina. The next half of the river, which is probably another 50 miles—30 miles has many, many Native allotments on it, just one after the other, right up the river. That central half of the river we're talking about now is the major part of the river that they use for their seining of fish when they do seine in the fall time. The main forks of the river—would you like me to get up to the map and show you up there?

Mr. QUARLES. Sure.

Mr. DRIVER. Up this far is the property on down to the ocean that's going to belong to the village of Kivalina. This area in here is where the seining takes place in the fall-time when they do seine for fish. This is what I call the forks. This is the main fork of the Wulik, going on up in here, and then this is what I call the north fork that goes here. And this area right in through here is where the mining emphasis is today, where there would be some 10,000 mining claims, and the upper part of the river, there are a few places you can land.

The types of wildlife that are found in these rivers—there are pink salmon, Artic char which is the predominant fish, dog salmon, a very few King salmon and a very few silver salmon in this river and lots of grayling. Wild—terrestrial wildlife you might see—obviously, you'd see grizzly bear, caribou, moose, and if you're in the upper part of the river and you have a powerful telescope, you may see a Dall sheep way over in this area here.

As far as floating the river, I can't see it could be called a floatable river. You can put in up here. I've done it a few times with people I take out with a raft. By the time I get down to my home, which is in this area right here, you just about destroy the raft, I mean, as far as—you have to lead it most of the time down the river.

Another thing, if you made this a scenic and wild river, I'm sure it would draw further attention to it as all these withdrawals. I think the people in Kivalina would be somewhat upset with people going by this area where they do catch their fish. This is the area they catch their fish in here. Also, in conjunction with the many withdrawals there, NANA Corp. has a historic parcel in here of about 1,200 acres that they've taken out, and I think that about covers it. If there's any questions, I'd be willing to answer them.

Mr. QUARLES. Any other comments on the Wulik? What about the Utukok?

Utukok River

Mr. DAPKUS. Dave Dapkus. The Utukok has really two great values. First, I'd like to talk briefly about wildlife. It goes through the principle calving grounds of the artic caribou herd that you've heard so much about today. It lies in the middle of that. The other thing—the one we'll talk about in a minute is the Colville—is this open tundra country one can see for miles. And, although I don't know that there's anymore grizzly or any other animals up there, I do know for a fact that one can see them much easier and more often because of the open space and so your chance of seeing something like a grizzly or wolf besides the caribou and wolverine are greatly increased over other parts of the state. Another wildlife value—this is a known peregrine falcon nesting area, as well as having gyrfalcon and ruff-legged hawks. The second value—we've found of the Utukok is its archeological values. A good many sites have been found along the river. It's an old traditional travel corridor for the Native peoples up there. It is also an easy float, class one water, and there's enough water in it. Thank you.

Mr. QUARLES. Yes.

Mr. GORDON. Okay, landscape values here are extremely significant. I might comment—just interject that we will be coming back to Congress after the NPRA study is over, propose to put a refuge up there, and this is in here. But the landscape values of the region—this is the third of three areas that I will discuss with regard to major entrenchment of drainage systems into relatively flat plains in Alaska. This is by far the most significant of them. The USGS calls them a magnificent section of canyon enriched topography. The area is a major river, its tributaries form something of a trellis system where the major river is deeply incised into the rather easily eroded bedrock, the side streams in many cases on this river form a series of parallel, rather short but very deeply incised tributary drainages. It's called trellis drainage. Since the dissection of it is many hundreds of feet in this area—deep wall vertical canyons, it gives an effect very similar to the canyonized country of the Southwest, although the scale is smaller. Climatically, it's a very arid country in terms of total precipitation and similarly, the rock is very easily eroded. That's why you have a similar area to the Southwest. The area is surmounted by buttes, mesas, and some rather odd, somewhat kidney-shaped mesas, if you will, that themselves have been deeply eroded into by these streams, forming very, very rugged mesa-type topography. You add it all up and you have a topography which is actually visible on an earth map of the northern half of the State of Alaska. You can see this topography very clearly on the Earth map. It's the best example of this type in the State.

Mr. QUARLES. Any other comments? Yes?

Mr. HOFFMAN. Barry Hoffman, Alaska Miners Association. You've already heard about the lead zinc mineralization potential in this area and all the headwaters of the river we're talking about does have lead zinc potential. Also, it should be mentioned that there are known coal resources along the rivers. They're essentially unevaluated and they are fairly far from the coast, but there definitely is some coal potential in this area. It also should be mentioned that this area has been mentioned as having possible uranium potential, also, fairly low grade and this would be in the sedimentary rocks in the area.

Mr. QUARLES. Let me ask you, if you can. You do probably recognize that these are fairly thin corridors depending upon whether we follow the traditional mileage of the corridor or whether we accept the wider H.R. 39 mileage. Are these deposits you talk about ones that are likely to occur only in the river beds or near the river or are they likely to occur generally outside of these corridors?

Mr. HOFFMAN. They can occur in the corridors. They might be best exposed in the corridors and I think that's really significant in this exploration. Also, getting access into these areas may be a problem.

Mr. LENT. Peter Lent, Fish and Wildlife Service. I've spent a total of about 3 months camping and hiking within the Utukok area, the corridor, and immediately adjacent to it. The benches which run east-west are very easy walking. They provide good access to upland areas which one can gain from the corridor itself. I'd also like to mention something more about the wildlife in addition to what Dave Dapkus said. The NPRA land use studies presently underway in that area have indicated the highest concentration of grizzlies anywhere in the North American Arctic in the upper Utukok area associated with the calving ground. That's also, as we mentioned, an area of high abundance of wolverine, although we don't have as good figures on that as for the bears. I know from my own time in the area, there's almost never a day when I did not see a wolverine from my camp or while hiking. One last fact—recent snow cover studies undertaken by USGS indicated the Utukok runs through an area of relatively low snow cover and also, looking at satellite inventory from the period of about May, we find that the snow runs off very rapidly along the Utukok, often earlier than in other areas. I believe this is at least part of the reason why the area is so important to caribou. It's also in my experience important in the springtime—immediately a mile or two of the river for ptarmigan, seeing approximately ten to twenty thousand ptarmigan within a mile of the river, and important for migrating waterfowl moving towards the coast during the springtime.

Mr. Hsu. Dick Hsu, National Park Service. We did archeological studies on the Colville and there has been quite a bit done on the upper Utukok and the travel routes, both along the Utukok and along the Colville Rivers, go back a lot further than we had suspected. The evidences that we have seen around the Utukok indicate that because it is close to the Bering Land Bridge, this may be some of the highest area that we'll find for determining when and where early man first came into the New World from Asia. This will tie in somewhat with Cape Krusenstern—the proposal down there. There are enough people from the geological studies and so forth and the archeological studies who feel strong enough that Park Service in the next few years mount a resident research project looking in that area for early man sites. Most of these probably will be overlooking both of these rivers. This would have been one of the major travel corridors.

Mr. Quarles. Thank you.

Mr. Mowatt. Tom Mowatt, Bureau of Mines. Based on field work last year, the U.S. Geological Survey has elucidated a region which they feel is geochemically anomolous across the Utukok and Driftwood Creek areas within the National Petroleum Reserve, which will be pursued this coming field season by the USGS and Bureau of Mines collectively within the context of the NPRA program, of which I'm a part. This, again, is in addition to the potentially national level of significance that the coal reserve resources of the area may offer that largely are unevaluated at this time and certainly the speculative sedimentary uranium potential which was alluded to is a very real possibility, as well.

Mr. Quarles. Yes?

Mr. Ovenshine. Would it be appropriate to make a comment on coal now?

Mr. Quarles. Certainly.

Mr. Ovenshine. If we're not following any order. This is Tom Ovenshine, Geological Survey. The area of the Utukok, Ikpikpuk and Colville Rivers crosses through what's long been known as a giant coal basin. Probably a current estimate of coal resources in that major basin is 120 billion tons to a depth of 3,000 feet. About 17 percent of this coal is bituminous and about 83 percent is subbituminous and for comparison, that's about 3 percent of the United States' known resources in coal. It's probably important to understand the way that esimate was made and I'll just hold this—maybe, Gil, you can hold that up—when Farrel Barnes developed this estimate in 1967, he had available to him only about 120 data points and these are shown on this diagram as yellow circles with a black dot in them or red circles. The black dot represents an outcrop of coal. The red circle represents a penetration of coal seams by a well.

So with a 120 data points, Barnes was unable to wrestle with the problem of continuity of the coal throughout the region and he made an arbitrary assumption whenever he saw coal, its thickness prevailed throughout a circle of a diameter of 6 miles and the 120 billion ton estimate is built in that way. As such, it's an estimate of rather specific nature. It's an estimate of what's in the rivers in coal in NPRA and it's a minimum estimate for the whole coal basin. If you think that what Barnes saw in the rivers is a reasonable sample of what lies in the rock where they're not exposed along rivers, you can make another calculation and that leads to the total resource estimate of coal for NPRA—for this big basin which includes NPRA—at 510 billion tons. In that amount, it would be approximately eleven percent of the total U.S. resources of coal.

Mr. Quarles. Let me ask a question because I think most certainly our members will want to ask this. We've been wrestling for approximately 4 to 6 years on the Surface Mining Act, worrying about what was the capability of the technology for reclamation for strip mine areas in the Lower 48. How far are we away, if there's anyone who wants to hazard a guess, from technology to strip mine or mine in any other form coal in permafrosted areas?

Mr. Ovenshine. There is a coal mine which I think is an underground or a hillside coal mine, operating today which is in permafrost. I only know that they have severe problems from working in permafrost. They have thawing in the pit, then fracturing and things like that.

Mr. Quarles. Are they attempting any reclamation in the area?

Mr. Ovenshine. This is essentially an underground mine.

Mr. Quarles. Underground.

Mr. Ovenshine. I don't know of any relevant experience in strip mining in permafrost terrain.

Mr. Jansons. In mining itself, there's probably not any real problem. The lead zinc mine that's operating at Faro in the Yukon—when we were there operated at temperatures that were about 70° below zero. The only problem you would run into is occasionally that the metal on the shovel buckets would get brittle and would crack. You'd have to shut down the operation and weld them. However, the other possibility is that you can mine this coal underground. As long as you keep the ground cold, it's not going to run on you or anything. It'll be all right. I don't know if this is how it turns out to be in fact, but the Anvil Coal Mine at Carmacks in the Yukon operates underground. The problem that you run into there is that you have water freezing on the track. This is an operations problem. It's not really an insurmountable mining problem. That's a small operation.

Mr. Quarles. Yes?

Mr. Hoffman. Barry Hoffman, Alaska Miners Association. There is an operating coal mine in Alaska, I'm sure you're aware of it. It's an open pit mine. It's in the zone that is discontinuous permafrost. They do encounter some permafrost there. They do work all winter long and they do in the winter and mine coal, also, in the winter.

Mr. Quarles. Have they attempted reclamation?

Mr. Hoffman. Yes, they've been very successful I believe the State's been very happy with the results. In fact, it's some of the best sheep wintering grounds in the Alaska Range.

Mr. Quarles. Yes.

Mr. Mull. Gil Mull, USGS. As many people, I'm sure, are aware, there have been studies carried on over the years on gasification of coal and I would just wonder—this is maybe more in the realm of speculation—if in the future some sort of process of gasification of coal involving neither strip mining nor underground mining might conceivably be developed as another method of utilization of this resource. I guess probably the only other comment I'd like to a make is that with the exploration that is currently going on in NPRA, certainly should any discovery of magnitude be found in particularly the southern or southwestern portion of NPRA that the Utukok drainage, of course, certainly would impact any possible transportation route out of that portion of the western end of the reserve. To a certain extent, also, of course, the Colville proposal also would have an impact on transportation. That goes without saying.

Colville River

Mr. QUARLES. Any other comments on this particular river? If not, then lets go on to the Colville.

Mr. DAPKUS. Dave Dapkus, Heritage, Conservation, Recreation Service. The Colville has really three main values, most of which have been talked about already. The first one is archeological values and the Park Service has found several sites along that. It's an old travel corridor coming from the Hotham Inlet up the Noatak, across the passes, down the Colville to the arctic coast. The second value that these gentlemen just talked about is geological values. The coal seams are quite evident along the Colville and I think I probably spent about eight nights this past summer warmed by a coal fire that burned with no problem whatsoever. Big seams exposed all along it. These are of scenic interest to the traveller—to one who is not a geologist, it adds color and beauty to the river area. There's a big folded—faulted—folded area, with anticlines and synclines that are cut by the river, exposing great bluffs that are very pretty. Then we come to probably the most important value and that is on these bluffs it's a known nesting area with many peregrine falcon sites along with gyrfalcon, ruff-legged hawks, and some bald eagles. The other wildlife along the river—here again the Arctic caribou herd is along there. We saw at least two different groups this past summer of a hundred each right on the river banks itself. We were within forty feet of them and there's also moose and grizzly bear and a lot of wolverine. And here again, I consider the Utukok, the Colville as a very open area where one can generally see for long distances and a lot of the grizzly bears that we did see were out at a distance up on the bluff along the river. You could see them for 4, 5 miles away. Thank you.

Mr. GORDON. The Colville is the longest of the rivers that runs to the Arctic Ocean. It does not have as deep grade. It's a long wilderness boat trip. The bluffs that Dave mentioned occur almost continuously for some two-thirds or at least half the length of the river. The rich wildlife, as Dave mentioned, includes peregrines. A National Park Service study of the arctic wilderness region for the national landmark system indicated the two more important rivers for their overall natural values, botanical, geological, and faunal were the Colville and the Igpikpuk and the Colville primarily for the peregrine, moose populations were significant, grizzly—the major one was grizzly along that river and the geological values.

Mr. QUARLES. Yes.

Mr. HOFFMAN. Maybe one additional comment on the coal resources in the area, which I'm not fully familiar with, but maybe the USGS could comment on is the increase in rank as you go to the south—what this will do to the wild and scenic river in the area.

Mr. OVENSHINE. Tom Ovenshine, Geological Survey. The area that's underlain by bituminous coal is shown on this map over here and it's dark blue. The area underlain by sub-bituminous coal is the pale color and the bituminous coal is approximately coincident with the foothills region.

Mr. QUARLES. Yes.

Mr. GORDON. The three areas of nesting of the races of peregrine falcon which are endangered, are, first, the upper Yukon River and its major tributaries; second—this is not in any order of priority—the upper Porcupine River Canyon and the extreme lower parts of several of its tributaries, and those two are good for reproduction; and third, possibly the largest population along the Colville but the poorest reproduction. Anything you want to add to that? On the statewide perspective.

Mr. BISHOP. Dick Bishop, Department of Fish and Game. That's about right, I think, as far as major nesting areas that seem to be persisting and maintaining some viability. Some of the other ones that have been maintained in the past have gone downhill for one reason or another.

Mr. QUARLES. Yes.

Mr. TILESTON. Jules Tileston, BLM. The administration's proposal for the Colville stops in the general vicinity of Umiat and there's no specific land status problems for that that I'm aware of. However, I believe that the conservation proposal or at least several of them extend downstream from Umiat—it is a legal question that is pending court action on ownership and it gets into definition of which is the right and left boundary of the Colville and it goes back to description, so there is a problem there. The right bank will be in Native ownership from Umiat downstream.

Mr. QUARLES. Yes.

Mr. DAPKUS. Dave Dapkus, Heritage Conservation and Recreation Services. One question I'd like to ask the USGS is they've told us the eleven percent in NPRA. I'd like to ask where else in the United States is the other 89 percent?

Mr. OVENSHINE. Well, it's not in Alaska. Approximately 92 percent of the Alaska's coal is on the slope. I think the State that would rank even higher in total resources than Alaska, if that calculation is correct, is Wyoming.

Mr. MAUER. My name is Fran Mauer with the U.S. Fish and Wildlife Service. It seems that some of the points that have been made about the peregrine falcon may not have been entirely clear.

In the State of Alaska, we have three subspecies of peregrine falcons. The crest of the Brooks Range is usually recognized as the dividing point between the Arctic peregrine falcon, which is an endangered species, from the Interior Alaska peregrine Falcon, which is also an endangered species. From a nesting standpoint, the Arctic peregrine falcon is having serious pesticide trouble somewhere in South America. The Interior falcon seems to be holding its own quite well on the upper Yukon River. The third species of peregrine falcon found in Alaska is a subspecies.

Its range is usually considered to be in southwestern coastal areas of Alaska, including the Alaska peninsula and the Aleutian Islands. That's a species that does not migrate and is not considered endangered at this time because it is not exposed to pesticides.

As far as the Colville is concerned, I'd like to add a couple of other things and that is that the moose population in the Colville is the largest moose population in the Arctic system in Alaska. Waterfowl values have not been mentioned in the lower Colville. The delta of the Colville River is a very important shorebird nesting area, one of the denser shorebird production areas in all of arctic Alaska. The gravel and sand materials in the Colville delta are very important denning sites for arctic fox. A few wolves, again, there, and it's a very important denning area for polar bears.

Ikpikpuk River

Mr. QUARLES. Any other comments on the Colville? In that case, we have the Ikpikpuk. I believe that's a coalition proposal. Would the coalition wish to speak to that?

Mr. GORDON. I didn't bring the publications. I didn't think we'd have enough time. This is one of the rivers I've already mentioned in the Arctic region which the natural landmark studies have found to maximum diversity for natural values. There are areas of what is called elongated or so-called aligned lakes in the immediate vicinity, good moose population. There's an interesting ecological site called the Valley of the Willow. There are other places similar, but the combination of features, plus the lake area is deemed to be a corridor for some in and out of that area. It's one of the three areas—a special management area because it's a critical northern waterfowl nesting and moulting area. It is not a recreational river. It was not identified for that purpose. It was agreed in the Alaska Coalition that river corridors can justifiably be protected for natural values. They don't have to have recreational values. That's all I have.

Mr. QUARLES. I notice as well up there that the river is proposed for study by the Commission. does anyone else have any comments on that one?

Mr. MULL. Yes, I think as a geologist involved directly in the exploration of the National Petroleum Reserve, I have to let some of my own prejudice on hydrocarbon potential show through. Unquestionably, by far the greatest hydrocarbon potential in the National Petroleum Reserve is in the northern coastal portions of the reserve, from Barrow on down to Cape Pelican. Almost unquestionably also, any significant finds that would be made in that area I would think the odds are would certainly tie eastward to the TransAlaska Pipeline system. thus anything that was discovered west of the Smith Bay would be effectively cut off by the Ikpikpuk proposal. In addition, of course, anything found within the reserve is separated from the transAlaska pipeline system by the Coville River study proposal. Again, access and transportation become extremely critical and my own particular prejudice is that the greatest potential within the National Petroleum Reserve is in this immediate north coastal area.

Mr. QUARLES. Your're saying that unless congress should supply the means of access across the wild river, then it would be effectively——

Killik River

Mr. MULL. That's correct.

Mr. QUARLES. Any other comments? There are also, I note, when you study these maps longer and longer, you find more and more. I also noticed that one river which has been proposed for study beyond the boundaries of, at least, the Andrus Gates of the Arctic proposal by the Commission is the Killik study river. Does anybody have any comment at all about that? We covered the Killik fairly well this morning in the discussion of the Gates of the Arctic. It extends a little bit beyond the—on up to the Colville.

Anaktuvik River

Mr. QUARLES. OK, the next one is the Anaktuvik, which also goes beyond the proposal and on into the Colville and in this case, it's a much longer stretch. Does anybody have any comments on that? That is both a proposal of H.R. 39 and a study proposal by the Commission.

Mr. GORDON. I just have one comment. The Anaktuvik was first suggested to the environmentalists by the Arctic Native Regional Corporation as a possible river that they would have less conflict with than the Killik and at that time, we hadn't investigated the Killik and now that we have, we really feel that the Killik is probably the premier river.

Mr. QUARLES. Any other comments?

Mr. MULL. Gil Mull again. I guess again, in connection with the hydrocarbon exploration and transportation, transportation from particularly the extreme southeastern portion of the National Petroleum Reserve, again toward the Pipeline corridor, would cross either the Killik and/or the Anaktuvik river proposal, again—some sort of transportation corridor might have to be established across that withdrawal.

Mr. BISHOP. Dick Bishop, Department of Fish and Game. I don't have any specific data on any of these rivers. It's already been mentioned that the Killik—the Chandlar River, which I don't think was mentioned, but it falls in the same category, the Anaktuvuk, the Colville and as far as I know, to a lesser extent, the Ikpikpuk are all important in this habitat area and of those, the Killik and the Chandlar are by far the most important. Well, the Colville is probably most important and of the tributaries, the Killik and Chandlar and the Anaktuvuk sort of bring up the rear as far as the tributaries go. But I think in a broader sense, the important thing to realize about those rivers from the standpoint of wildlife values is that they really are arteries of life as far as the North Slope goes as far as moose populations go—the only reasons that there are moose there, period. Beyond that, they're the prime areas for life support for predators and carnivores, as well as some of the herbivores and that also applies to scavengers and just about everything else. Aside from those animals that are particularly adaptive to use of tundra, the wildlife is very much concentrated in the rivers. They are highly important from that standpoint to the North Slope.

BERING LAND BRIDGE/SEWARD PENINSULA

Mr. QUARLES. Any other comments on wild rivers? In that case, we'll turn to the Bering Land Bridge/Seward Peninsula proposal. Let's go off the record.

Mr. QUARLES. Dick Stenmark will present this area.

Mr. STENMARK. OK, on the Seward Peninsula, we want to address all of the northern coastal plain in here—where you can see the darker green down through this area, down through the Bendeleben Mountains. I think the Imuruk basin in here where H.R. 39 runs down through and this northern area here, in different proposals, gets up into the foothills somewhat here, although it doesn't quite get to the hydrologic divide in this ara. And it's also one study river over in here, the Koyuk coming up in this area on up toward the Imuruk Lake area. And I believe that's about it except for the small refuge proposal, the unit just west of Goloving and the islands over in this area.

Mr. QUARLES. Now, if we could, we'll just concentrate on those areas other than the small refuge proposal because we touched upon those the first day. So that anyone sitting in this room wondering if we're going to get to them, it's my sincere doubt we get beyond scenic values tonight. So if anyone has got other pressing appointments, believe me, that's as far as we'll get tonight. Who would like to start on scenic values? Yes, go ahead.

Scenic, Landscape, Historic and Archeological Values

Mr. NEWMAN. Stell Newman, anthropologist, National Park Service. What I would like to do is just briefly put you on the map in terms of a geographical feeling and then go on to discuss the scenic and visual aspects of this area and I will be as short as possible. If you wish any additional detail, we have it available.

The Seward Peninsula, as you can tell, is the westernmost extension of the North American mainland and is opposed about 60 miles away by the Siberian coastline. The main town on the peninsula is Nome. A number of villages are located primarily around the periphery. The ones most concerned with the village at hand are the village of Deering at the upper right of the easternmost part at the top, just outside the proposal, Shishmaref which is on the Bering Strait, located on an island—you can see it with village withdrawal lands as an inset on the proposal, Wales which is on the extreme tip of the peninsula, Teller, which is between Grantley Harbor and Imuruk basin on the Turksuk Channel waterway. That's the demography. The terrain will be gradating from a low tundra at the extreme northern part. It's a wet marshy tundra area dotted with innumerable lakes. The extreme northern part is a tip of the Espenberg Peninsula, sandy with beach ridges which I'll mention again later, a line of barrier islands along the coast of the Bering Strait itself. The land will gradually rise into foothills and then about 2,000 foot high mountains as you come down toward the south and go beyond the boundary of the proposal on the western half. On the eastern portion, the land will continue to rise until you reach a plateau about 1,000 feet in elevation. You'll find here a number of lava floes moving across the tundra with Ropipahoihoi and Ah-ah lava types both present. A series of lakes, some quite large, in fact, the largest lake on the peninsula there is Imuruk Lake. The distance that one can see are grand. You have a sweeping view, unimpeded by anything like trees.

The terrain is subtle. You cannot appreciate it from the air. It has to be seen on the ground. The vegetation is of particular interest in a microcosm sense. Numerous tiny flowers during the summer are there. You have rivelets and channels with vegetation along the sides that are also very beautiful. One of the most spectacular scenic spots there is a place called Serpentine Hot Springs in the south central portion of the proposal which is a valley with a series of ridges around it. The tops of the ridges have tall granitic tors or tall columns sticking up like a stickleback fish, or a comb. Some of these granitic spires are over 100 feet in height. It's really a scenic wonder and in 1970, the Alaska Legislature passed a joint resolution asking the Secretary of Interior to consider making that area a Serpentine Hot Springs National Park. Basically, that's the scenics that I want to cover.

Now, to discuss the historical, archeological and paleontological values comes to the heart of why the National Park Service is proposing this area. And to borrow a phrase I've heard fairly often here in my tenure, one can say that the geological conditions are permissive for the occurrence of massive deposits of significant paleontological remains relating to the Bering Land Bridge. [Laughter] In all seriousness, this area is proposed for inclusion in the National Park System because it represents a relic portion of the ancient land bridge which once connected the Old World and the New World and I won't bother you with the dynamics of it. It suffices to say that it came and went over a series of many thousands of years. The land bridge—each time it was present—extended about 1,000 miles from north to south. The Bering Land Bridge Preserve proposal would preserve a relict portion of this along the central backbone of that 1,000 mile wide land bridge. It is not the entirety of it. It's only an infinitesimal fraction of it.

This land bridge is important to our Nation's history for over the bridge came many of the mammals, birds, insects, plants that we know to be common to the New World today. This was the entry point for many of these life forms into the New World and ethnocentrisically, most importantly, over this land bridge came man and that is the primary and predominant significance of this proposal. It would set aside and commemorate and interpret for our Nation's people the entryway into the New World of man himself.

This theme is not present or interpreted in any other area of the National Park System and yet it certainly would appear to be one of the most fundamental cultural and historic themes that should be. The land bridge, then, was the gateway into the Americas of man and this represents a portion of it. The men coming in came in tens of thousands of years ago to spread out throughout the remainder of the Americas, North, Central and South America, to become the ancestors of every American Indian group in the entire New World. Every American Indian group. The Athabascans, the Balaska in Canada, the Zuni, the Iroquois, the Aztec, the Maya, the Inca all trace their ancestry to these early people who came across this land bridge.

Now, this is not new information. The paleontological deposits present here are not new or prospective finds. We know them to be present because we have some 25 years of scientific publications on record relating to research done within the boundaries of this proposal. The materials coming forth from this proposal area have yielded the information which made it possible to develop and interpret this land bridge theory itself. The deposits include tree trunks, branches, roots and even green leaves excellently preserved in the permafrost and underneath the volcanic ash explosions. Small mammals are present. We even have remains of insects. Large mammals are present in many areas. In fact, during the summer of 1976, I walked a 30 mile stretch of the Bering Strait beach and found five mammoth skulls rolling in the surf directly in front of where they had washed out of the thawing permafrost. We also have one of the rarities of rarities, and archeological site demonstrating human activity in the area at the time of the Bering Land Bridge.

We also have—on another subject—geological features here of national significance. In the Imuruk Basin area are found surface lava floes of types found in other areas of the world, but here you find them in a northern environment. The lava tubes are filled with permanent ice, unlike Hawaii. In the northern portion, in the area around Devil Mountain, you have the Devil Mountain volcanic area charachterized by a series of unique lakes. These lakes are maars. This is a technical term for a gigantic lake system caused by a steam explosion when the magma from the volcanics came into contact with the water and the permafrost and surface layers, two explosions occurred which literally ripped square miles of Earth from the surface. These later filled with water and they're the maar craters. Clear today and unique because they occur in pairs.

The archeological record here is also extensive. It is second to other areas such as Krusenstern, but we also have some 6,000 years of Eskimo pre-history in the sites located within the proposal. Historical sites are here primarily relating to the famous Nome Gold Rush of about the turn of the century when some 40,000 prospectors were on the beaches of Nome looking for the gold and then spread outward throughout the Peninsula, again seeking gold, and I found, for example, several collapsed sawed miners' cabins along the Kuzitrin River and the Naksapaga River. In summary, then, this proposal would set aside a representative sample of the Bering Land Bridge, a terrain that is unglaciated during the Ice Age and hence a relic of the Bering Land Bridge, a refugium of plant life and animal life because at the time of the Ice Age, this was an extension into Alaska which was mostly under ice and then later was cut off to become physically part of Alaska, but a refugium for many species of life from the Old World. So this would preserve, interpret this for our Nation's people.

Mr. Shanks. OK, I'd like to talk primarily about two areas that are of very scenic significance, the Imuruk Lake area and the Imuruk Basin area, which should not be confused, even though they are part of the same name. In this area here, the Kovgurok Mountains which form the south boundary of Imuruk Basin and proceed on to Pilgrim Hot Springs and down into this area, running on into the Bendelebens over this way—are very sharp toothed and of recent origin type mountains and provide a very scenic backdrop for this entire area along this north side. On the north side of Imuruk Basin near the mouth of the Igpuk River, these form an outstanding view which—the only thing I can think of that you might be able to relate it to would be the view of the Tetons across Jackson Lake. The only difference being that you're not standing with a thousand people when you look across. The Tuksuk Channel is a very deeply incised waterway which averages from 500 feet to 1,000 feet below the bluff level all the way through here. It forms a very narrow canyon with very placid water which is again a very scenic area. The upper end is a basin where the Kuzitrin River runs in. It is also very scenic, not so much for its grand views, which it also has to the south, but also for the myriad of waterways which support quite a bit of varied wildlife, lots of waterfowl and moose and that sort of thing.

Also the mouth of the Igpuk River is another lowlying scenic area, myriaded with waterways nesting habitat for—well, I've personally seen ducks of about four or five different species, a couple species of geese, and a great many sand hill cranes nesting in this area here.

Also, to add a little bit to Estel's expression of the history of the area, it's probably significant to remember that the 1st railroad in Alaska was built on the Seward Peninsula, connecting Nome with the Bunker Hill area, which is up in here. Now this area which is another unique feature of this area is that it is available by road. The road from Nome comes up into the area here at Kuzitrin and on up ending at Taylor which is up in this area, and also from the Northeast corner is available by road at Deering. There's a road that comes down the Inmachuk down to this area in here, also available by road via Teller, which is outside the area.

The other area I'd like to speak about is this area in the northeast area which, as Estel says, offers a very unique type of visual area that I have never run into anyplace else on the peninsula and that is these high lava beds in here which essentially form these lakes here and also form other lakes over on this side. The very recent formations are not at the moment covered by tundra and it also provides a unique opportunity to kind of look at the succession which has taken place on the Seward Peninsula from lava up through the present covering many of these areas. This is a very shallow lake and river running out of it which is the Kugruk is also a very scenic area of some interest. Also—to add just a bit more to the history—there are several old mining camps out in this area here. Many of the buildings are still in existence.

The Rainbow area, which is out in this area, is still in existence. An old ghost town about the turn of the history. If you put that overlay down, it shows the sites. Just as a point of interest, I was flying in this country this summer and several of these sites—like the small little kairns up on top of these ridges and they're very predominant from long distances away. I don't know exactly what the uses are—but they're a very unique type of site that is not really very common to the rest of the area. They're not the typical archeological sites which one thinks about.

Mr. QUARLES. I'd ask just one question. I noticed on this map of the Administration's proposal, the series E map, there appear to be at least two communities located within the parks boundary—three, I quess. Aurora, Serpentine Hot Springs, and Cottonwood.

Mr. NEWMAN. No, no one lives there. They're more traditional place names than anything else.

Mr. SHANKS. The Hot Springs does provide kind of a—I don't want to call it a resort, because that's not really the usage, but there is a bath house there that people from Shishmaref use and some of the people from the Taylor area use.

Mr. HOFFMAN. Well, there's a building, also, that the National Guard put up. It's quite a substantial area. There's an airfield there and people go from Nome and use it quite a bit.

Mr. ATUK. Richard Atuk, Bering Straits Native Corporation. Mr. Shanks said there is a road going north and, in fact, there is one about 90 miles—right at Pilgrim River, there's quite a sizable community comprised of the Department of Highways to take care of the road, a lot of camps, all along the way so that we're talking about 3 or 4 months out of the year where there is quite a bit of activity along that particular road and right now, there is nobody—Serpentine is used quite a bit by the village of Shishmaref as a hot springs and Aurora, I don't—I can't recall where that is.

Mr. SHANKS. Yes, the Pilgrim area is outside of the proposals and the proposal cuts by just north of Taylor, betwen Taylor and Serpentine. There's also a kind of summer community at Kuzitrin, too. The Kuzitrin drainage.

Mr. MULLIGAN. John Mulligan, Bureau of Mines. The area on both sides of the highway going to Taylor is a historical mining area, but it's also a present mining area and represents a very important part of the Seward Peninsula economy.

Mr. HOFFMAN. Barry Hoffman, Alaska Miners. I also wanted to mention the present mining area, but also something that was failed to be mentioned about in the volcanic area—that there are some very recent volcanic zones out there and they are quite spectacular and this is a very nice area.

Mr. MAUER. Fran Mauer, Fish and Wildlife Service. I'll mention the bird life at another time under wildlife. I do want to mention the recreational aspects of some of these. From the standpoint of bird watching, some of the professional, all-time great birdwatchers I've seen spend their lifetime accumulating a large life list of the birds they've seen. They enjoy this area very much. It's a real birdwatchers' trophy hunting area, you may call it, because of the high occurrence of Asiatic species of birds which occur on the Seward Peninsula, coming over from Asia, and many of these species are found nowhere else in North America.

Mr. QUARLES. That's a brand new term. I like it. Birdwatchers' trophy hunting area. Any other comments on the scenic values?

Mr. MULLIGAN. I might point out that these lava floes are beautiful, but the only real way to see them is from an airplane or a helicopter. When you're on the ground, they're very difficult to see.

Mr. GORDON. May I speak to that? I'm speaking now to seeing them on the ground. I really must say that I think it's quite the reverse. From the air, they don't look like much. From the ground, particularly if you are in place into the lava fields, examination of tundra—the lava has relief of up 30 feet and it's quite something to climb around on the ground in places. It can be very spectacular. In the fall, there's a lot of successional vegetation or the vegetation is just coming back in—in the fall, you can really see the diversity from the lichens, which, of course, are pale green to the various (indiscernible) which turn green and red and so forth. The edge of these lava beds from the ground is quite spectacular.

Mr. Hoffman. I'd just like to point out that I'm glad you said edge of the lava field, not inside the lava field. It's really difficult to get over. I've had personal experience out there and it's like any other lava field, like say—what is it—Valley of the Moon in Oregon or even just walking over some of the salt areas in Death Valley. Very difficult and I don't think you'd find many people in there just to walk around.

Mr. Quarles. Any other comments on Scenic, Landscape, Historic, and Archeological Values? No comments? Well, in that case, it's an appropriate place to adjourn until tomorrow morning. We'll begin with Wildlife Resources and Uses.

ALASKA NATIONAL INTEREST LANDS WORKSHOPS

TUESDAY, FEBRUARY 21, 1978

ANCHORAGE, ALASKA

Mr. **QUARLES**. The workshop will come to order. We are on the Bering Land Bridge and I think almost everyone here today has been here at least one other day, so there's no reason to go into the ground rules. We are going to have to hurry today because we've got four more areas, one more area than we've had almost every other day. We have finished or almost finished, unless somebody is asked to say—to get the last word on the scenic and recreational values of the Bering Land Bridge, Seward Peninsula. We will promptly go on to the wildlife. I believe the Alaska Coalition has something to say.

Mr. **SHANKS**. Yes.

Mr. **QUARLES** [continuing]. On scenic values?

BERING LAND BRIDGE

Scenic, Landscape, Historical and Archeological Values

Mr. **SHANKS**. OK, Rollin Shanks from the Alaska Coalition. Just a few quick things. The upper Kuzitrin area above the Bunker Hill old site has a great collection of paleontological sites which have been excavated. Some of them are believed to be one of the largest paleontological finds on the Seward Peninsula. Also, downriver, there is the old village site of Kawerak which lies at the mouth of the Kuzitrin and has been occupied up through some of the local history. Several of the people who live now in Teller were orginally from the Kawerak site and it's believed that it dates back approximately 2,000 years. It hasn't been fully explored yet, but it's believed to be a very important find. At the entrance of Tuksuk Channel into the Imuruk Basin is a very high bald hill which the local residents told me a once a legend about. This was where the people who lived in Kawerak used to stand and watch for the Siberians who used to periodically invade that area. Also, in Tuksuk Channel, there are some of the only Eskimo petroglyphs that have been found, which is a little bit further up the channel and in the Grantly Harbor area, there was a Park Service inventory done which found approximately 57 archeological sites.

When you start stringing all these archeological sites together, you find a great arch that comes in through Point Spencer to Grantly Harbor, Imuruk Basin and on with the Kuzitrin River, which is probably one of the primary paths for people as they crossed the Bering Land Bridge. Some of these areas are in village

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selection areas, and, of course, those will and rightfully belong to the Natives. However, I feel some of these areas that are not village selected could also be protected to try to maintain the continuity in this area.

Mr. QUARLES. Any other comments on the scenic values? On to wildlife values. Go ahead.

Wildlife and Fish Resources and Uses

Mr. MAUER. My name is Fran Mauer, U.S. Fish and Wildlife Service. Stell Newman very capably described the Seward Peninsula yesterday as a land bridge where many migrations of flora, fauna and man took place in the past. Today, we have a living resource that continues to represent this migrational phenomenon which began thousands of millions ago. This area is truly a crossroads for migrations of birds, mammals and fish. It is equally significant for its production of North American wildbird species. Migrations appear both in an east-west and north-south orientation, many of which occur simultaneously.

As I alluded to yesterday, the Seward Peninsula offers unusual opportunities for bird watchers and it is a focal point for many enthusiasts. Examples of what I'm referring to are the common occurrence of such species as the eider which winters in Central Africa, the white wagtail, yellow wagtail, bluethroat and arctic warbler, all of which winter in a region from Borneo to India, the red-throated pippet which comes to this area from China. Less common, but probably not unusual for the area are such species as the bar-tailed godwit from New Zealand, the European widgeon, the ruff, which is an Old World variety of shorebird, and green-throated loon from Asia.

What makes the Seward Peninsula unique is not only the high probability of someone seeing such birds, but also from the zoogeographic and scientific standpoint, the exchange and the expansion and contraction of these unique bird ranges across the continent. I'd like to also add that these east-west migrations are not only—are not a one-way process of birds coming to North America from Asia. There are several examples of North American birds which cross this area and nest in Siberia. Examples best known are the thousands of sandhill cranes which cross the Bering Strait to nest in Siberia. Another good example is some 300,000 lesser snow geese which cross in this region to nest on Wrangell Island off the Siberian coast.

Recognizing the immense significance of the bird migrations between the two continents, the United States and the Soviet Union have signed an International Migratory Bird Convention. This document calls for cooperative scientific study, management programs and designation of conservation areas for birds shared by both nations. The Seward Peninsula would be our most logical designation on this side of the Bering Strait.

In addition to the unique east-west migrations, there are equally significant migrations occurring in a north-south orientation. The coastal lagoon systems on the north and west side of the Seward Peninsula are some of the first coastal nesting and staging areas that migrating birds encounter between the Arctic and the Yukon Delta. So these are very important to north-south migrating birds.

In addition, the Bering Strait is a focal point for huge nutrient exchanges between the Bering Sea, North Pacific and Yukon River system, passing on into the Arctic Ocean. In summer, these warm nutrient-laden waters go north through the straits, bringing with it a flotilla of birds and marine mammals. Whales, such as the bowhead and beluga, travel north along with walrus and several seal species which follow the ice path retreating into the Arctic. In spring, flying north, following the open water leads come millions of eiders, old squaws, scoters, black brant, thick-billed murres, horn puffins, ivory gulls, and kittiwakes.

Each fall marks a reverse migration of this process with the birds returning to wintering areas in the southern Bering Sea. Not only is the Seward Peninsula important for migrations, it is also a very important breeding habitat for waterbirds as well. The average fall flight of ducks in the area amounts to over 400,000 per year. The most common species include pintails from the Pacific Flyway and greater scoff which migrate all the way over to the Atlantic Flyway. Large numbers of geese, Canada, white-fronted, emperor, crackling Canada geese, and black brant are also produced in the Seward Peninsula Wetlands.

The large lake system, such as the Devil Mountain and Killeak lakes which Stell (Newman) mentioned were produced by the steam explosions, are prime moulting areas for geese. The inland large lake systems such as Imuruk and Kuzitrin are also used for moulting geese. Cape Espenberg is a very important area for a great variety of wildbirds and it has been recognized as the highest density area for loons in the entire State. They are represented by four species of loons there, and occasionally you can find a green-throated loon from Asia in the area, also.

It's also noteworthy to mention the supreme habitat for gyrfalcons that's located in the granite Tors around Serpentine Hot Springs. Many experts throughout Alaska have claimed this spot to be the best—the best one in the entire State for observing gyrfalcons.

I will mention a couple of things about mammals in the area. We have an introduction that's been made of muskox, perhaps Carl Gravogel from the fish and game department will elaborate on that. Moose are increasing in the area and presently are at—probably at maximum carrying capacity in some of the areas on the Seward Peninsula. Thank you.

Mr. QUARLES. All right.

Mr. GRAVOGEL. Carl Gravogel, State Fish and Game Department. Fran went over to the small game, particularly the birds, and I'm going to confine my remarks to primarily the land animals and more particularly the big game species. I'll go through them very quickly, specie by specie. The primary ones out there are moose and bear. There were caribou a few years ago, perhaps in the late 1800's. They no longer exist except on the extreme eastern portion of the peninsula and that is part of the migrating western arctic herd. For all practical purposes, they'll probably be outside of the boundaries of the preserve.

I'll go on to moose. There were few, if any, moose in the area prior to the 1940's. They're rather recent immigrants to the area. Probably a few individuals moved over from the Yukon River, established—provided the nucleus for the present herd that we know of today. And there was a rapid increase in the population in the late sixties and the early seventies. Most of the Seward Peninsula is climax willow vegetation and it suited their needs fairly well.

From our spring surveys, the minimum population in the area is estimated to be 1,000 moose and I'm speaking just within the preserve itself. The minimum population size for the drainages are as follows: The Serpentine Arctic River system, about 120; the American river Agiapuk, about 205; the Kugarok Kuzitrin system, including some of the Pilgrim River, about 550; and the Goodhope on the north side a little over 100. Bull/cow ratios are still good, averaging about 60 bulls for 100 cows and based on our spring surveys, again, the annual recruitment of yearlings to the population is between 20 and 25 percent. In the early seventies, it ranged as high as 30 percent. Now, in some of the areas where the moose are perhaps at winter-range-carrying capacity, productivity is leveling off or has decreased somewhat.

Mr. BEVINETTO. How long have the moose been in that country?

Mr. GRAVOGEL. Well, they came in probably in the early fifties, but there was only a few stragglers and it wasn't until the mid-sixties that they really began increasing in any numbers and, actually, the—if you were to draw the classical curve, number of animals there, you'd find that the doubling in the size of the population took place in the early seventies—late sixties and early seventies.

Mr. BEVINETTO. Thank you.

Mr. GRAVOGEL. The distribution of the animals varies depending on the season. Because there's very little climax spruce on there, they're primarily confined to the broad river valleys in the winter and this is almost entirely their wintering range, depending on snow depth, but their visibility is good in the spring. I'm talking now February, March, and April. And in many areas, they resemble grazing cattle. It's not uncommon on some of the portions of the Kuzitrin and the Kougarok to see upwards to 30 and 40 moose all in a quarter mile of one another. It's very dense concentrations in the winter, sometimes exceeding 15 to 20 animals per square mile.

With the coming of spring, there's a gradual movement out of the river valleys to the higher elevations and they generally follow the tributaries of the drainages to their headwaters. During the summer, they disperse widely throughout the entire Seward Peninsula and as a matter of fact, they're even found in habitats that most people wouldn't consider suitable for moose. I've seen them right out in the tundra feeding on just low willows not more than 6 inches high. Particularly the yearling bulls, they do a great deal of traveling and it's not uncommon perhaps during the summer for a moose to move anywhere from 20 to 50 miles from his original home range.

Moose in this area are utilized extensively by local residents and they harvest on the order of between 150 to 200 moose right out of the preserve. Now, a substantial majority of these are taken by residents from Nome utilizing the Nome-Taylor Road. Now, the two-wheel highway portion runs about 90 miles north of Nome. If you have four-wheel drive, you can go all the way to Taylor, which is another 15–20 miles. A vast majority of the harvest is taken within 5 miles of either side of the road. However, all-terrain vehicles and boats are also used with this transportation, boats going up and down the major river systems, particularly the Kuzitrin, Kougarok and the Agiapuk. Utilizing the highway, there's also some limited degree of all-terrain vehicles. In the early fall, there's anywhere from 20 to 40 aircraft operating out of Nome that utilize some of the more remote areas, landing on gravel bars and hunting there as a basic camp. From October through January, snowmachines are the primary means of transportation in conjunction with aircraft and they, again, hunt up in the—either in the—they hunt in both areas, either along the main river or upper drainages. To some degree, these transportation means compete with one another, but I guess the most important point to emphasize is that the vast majority of the hunting pressure is along the Nome-Tayor Road. The resident population of Nome is about 3,000 individuals and nearly a third of those are hunters, somewhere around the neighborhood of 600–800 hunters are driving up and down that road during the course of the season.

Moose meat has not been what you'd call a traditional subsistence item on the Seward Peninsula by the mere fact that it's only been there for the last 15 years or so. Most of the people in the outlying villages, when I first came there 8 years ago, wouldn't have anything to do with moose. That situation has changed somewhat. Now, I would say that there is a pretty large demand for the animal, particularly in the early fall. However, I doubt that there is anyone on the Seward Peninsula who totally depends upon moose meat. It was mentioned earlier in testimony that marine mammals constituted perhaps 80 percent of some of the dietary intake of some of these coastal residents. On the Seward Peninsula, this was certainly true 15, 20 years ago. Their diet has changed considerably in the last 10 years, but, again, moose meat is not what you'd call a supplement that is actually and absolutely needed.

I'm going to jump to bear here for a minute. During the early 1900's when the miners came onto the peninsula, they probably eliminated most of the grizzly and if there were any moose in the area at that time, they probably got them all. So there was some indication that moose had been on the peninsula in the 1800's, but the miners got them all. Today, the bear population on the Imuruk has probably returned to former numbers. Based on our aerial surveys, incidental sitings, and reports from the public, both in the villages as well as people out and utilizing the area, I estimate that there is 1 bear per 100 square miles to as high as 1 bear per 15 square miles in some of the denning areas in the upper Kougarok-Kuzitrin area. In absolute numbers, I estimate there are approximately 200 bear in the preserve.

The highest concentration, again, occurs in the Kuzitrin-Kougarok area which is both a denning and summer area and they come down occasionally on the rivers to feed on fish. A number of bears are sighted along the coast, occasionally feeding on peregrine. But I think this is perhaps a temporary phenomena taking place primarily early in the spring when there's not a heck of a lot else to eat after they emerge from hibernation. The reported harvest of grizzly bear in the area is about 5 per year. The actual harvest is estimated to be 10 to 15. A heck of a lot of these bears are shot in defense of life or property. We've got a great number, almost the entire Seward Peninsula is under reindeer grazing permit. The reindeer herders and the grizzly bears don't have much love for one another, particularly in the springtime during calving, and this last spring, I know of at least 7 bears that were killed out of season in defense of life and property in protecting the reindeer herd. A lot of these are not reported. The carcass is either left there on the ground or, if it is retreived, the only time we ever hear about it is often through word-of-mouth.

Although the annual harvest is relatively low, there are a number of recreational hunters, particularly from Nome, that annually seek these bears. Access to the preserve is, again, primarily by the Nome-Taylor Road and often they hunt bears in conjunction with moose hunting in the fall. There are some, again, aircraft hunters and they utilize the gravel bars. Snowmachines in spring are utilized during the spring season. In most years, the snow cover during the May 10 to 25 season is sufficient enough to utilize snowmachines in the higher elevations.

At least one registered guide—he makes his home in Anchorage, but has come out during the spring, conducts regular hunts there. There is now a registered guide living in Nome and there are occasionally a couple coming through during the spring that also conduct hunts. In summary, then, most of the bears—almost entirely all of them that are reported are used by recreational hunters. There is occasionally a case of a guy who claims that he needs grizzly bear for spring meat, but this is certainly isolated and almost insignificant.

On to polar bear and I'm just going to mention this species in passing. It goes without saying that there are no resident animals on the Seward Peninsula throughout the year, but commonly, bears are sighted along the coast in the wintertime, generally from September through April, and it's primarily the area from Wales northeastward to Estenberg.

For the last 3 years, now, residents from these villages, Wales and Shishmaref particularly, Diomede to a limited degree, have harvested 20 to 30 bears annually. One individual that I know personally from Shishmaref has nearly 20 bears to his credit. Most of these are killed when they're feeding on—or sighted when they're feeding on walrus and whale carcasses that have washed up on the beach. About half the meat is salvaged, but for the most part, they're interested in the hides for either home use or making them into some garmet for sale.

Turn to the fur bearers. The major fur bearers in the area are red fox, white fox, wolverine and wolf, land otter, and the lynx occasionally. White fox are abundant along the coast from Brevig Mission, which is about 30 miles east of Wales, and north all the way to Estenberg, white fox are abundant along the coast and both the villages of Brevig, Wales and Shishmaref take a fair number in the trapping season. The density of red fox in the Imuruk is perhaps one of the highest throughout western Alaska, if not the State. In years of—they're cyclic like a lot of our fur bearers. Last year, they were probably their all-time high and there were—I just have to guess at the number out there, but certainly in excess of

10,000 and maybe as high as 30,000 to 50,000 red fox on the Seward Peninsula. Almost 90 percent or more of the animals caught in this manner are by commercial trappers. With the price of long-haired furs as they are, it's not economically feasible for the individual trapper to keep it for himself. He sells them on the market.

There are approximately 25 to 50 resident wolves, both on the Seward Peninsula and on the preserve. There are not any large packs. There's one pack in the Kuzitrin of about 10 to 15 individuals and there are occasionally scattered wolves around the Shishmaref Arctic area, sightings of 2 to 5 animals. The harvest is about 2 to 10 a year, averages more around 5. Most are used, since there are not a great number of wolves on the Peninsula, almost all of them are cut up for ruffs for parkas. Again, however, it's not uncommon—you can get about six ruffs out of a hide, so they use three for the family and sell three and make a profit off of it.

Wolverine are common and widely distributed throughout the entire Seward Peninsula, including the preserve, and approximately 15 to 20 are harvested annually, most by people from the rural villages. About half of them are taken by snowmachine hunters, following their tracks and then taking their rifle, and the other half are actively trapped. Most of the hides, again like wolves, are used in the garment industry for ruffs or parka trim.

Aircraft are used to a limited degree to hunt both wolf and wolverine on the Seward Peninsula. There's been an active predator control program first started by the old Fish and Wildlife Service back in the late fifties and actually continued on through the sixties. There was one Fish and Wildlife agent through all the sixties that almost completely eliminated—or not eliminated, but took most of the wolves off the Seward Peninsula and he operated out of Kotzebue. Aerial wolf hunting has ceased for all practical purposes in 1972, although there have been limited hunts by permit and they've taken anywhere from 5 to 10 wolves a year, depending on the regulations.

OK, I'll move on to muskox then. The initial transplant occured in 1970. At Feather River 36 animals were released and I'm not going to go into all their movements. It suffices to say that they spread widely for the most part throughout the Seward Peninsula, but eventually there were two small groups that had established some home range and herd integrity. They are perhaps—not perhaps, are now reproductively viable. Those two groups are—one of them is near Black Mountain, north and west of Brevig about 10 miles, and they've been there now for about 3 years.

They number about 15 individuals and produce 3 to 5 calves a year. The other group is on the north side of the York Mountains. They generally winter just to the west of Ikpek Lagoon, but they've been sighted all the way from Shishmaref to Wales. That group numbers about 18 individuals and they produce about 6 calves a year. The situation is similar on the Seward Peninsula as I described for the Point Hope area. Attrition—they're just about keeping up with reproduction. However, the last couple years, we've noticed at least two herds that have maintained some integrity. The whole range appear to be increasing slowly. That pretty well covers the big game species.

I'd like to make—I'd like to close by making a few general comments. Yesterday, I heard some individual say that the viewing on the Seward Peninsula was in his opinion excellent because he could look back on the—he was speaking about the Kigluaik Mountains and said that he could look back there and see the mountains in the distance and it was quite a spectacular sight. And I agree, but he didn't make the comment that there was nobody else around and I agree for that very reason. They are spectacular because the Seward Peninsula, even though there's 2,000 people in Nome, is relatively unpopulated in the outlying areas. I spent 6 years on there. I flew all over it, got hundreds of hours on the ground. I'm somewhat concerned personally and I think I probably speak for the Department as well in the size of the preserve—if it's really need to that extent. I've talked somewhat to the individuals involved and we have a—whether it's recreational or subsistence hunting, there's a great number of individuals—resident individuals in the area who depend both on the resource for sustenance and both on the resource for recreational activities. If we make this preserve and bring attention to it, we're going to have a great influx of people into the area, more so than we have now.

If you take all the land area that is there, the preserve, all the withdrawals that the Natives have—and you overlap that, you find out that almost the entire Seward Peninsula is withdrawn in one area—in one type of land classification or another and the average Joe Blow who doesn't own any of it, particularly the resident of the area—I can foresee that there's going to be so many restrictions on him, he'll have a very difficult time pursuing any activities that he's been involved with over the last few years.

Mr. QUARLES. Thank you. Any other comments on wildlife?

Mr. ATUK. I'm Richard Atuk, Bering Straits Native Corporation. I'd like to start with a few clarifications. If we just assume that the cost of living up there minimum is $10,000 and I just pulled this figure out of the air, and that the average income is about $3,000 for the villager, that leaves $7,000 a year that has to come from somewhere and further, if we use the population figure of 6,000, this gives us $42 million a year that the wildlife is worth to the people up there, not only wildlife, but the berries and et cetera—the driftwood and so on. Now, 20 percent of this is about $8 million. I'd like to talk just a little bit about this 80-percent figure that was given to the sea mammal resources and if you study our area there, you'll know that most of our villages are along the coast. From Golovin to Wales and Shishmaref, most of the harvest of sea mammals is in the springtime when the ice is moving—breaks up and is moving and the animals are migrating. At which time they're taken and preserved and supposed to last most of the rest of the year. It sometimes happens that we have a bad year, as we did last year, when the ice didn't break up properly. It broke up too small and it was too dirty so that very little game was taken, practically only from Golovin to Teller.

Mr. WILLIAMS. Excuse me, what do you mean by dirty?

Mr. ATUK. Well, I don't know where the dirt comes from, but the——

Mr. WILLIAMS. Do you mean literally dirty?

Mr. ATUK. Yes, literally dirty with dust and dirt and things that blow off the mainland. And the animals will not sit on this for the most part. Anyway, last year we had a bad season. When something like this happens, you need other areas to turn to and although we're primarily coastal—and I'd like to go to the map later to point some of these areas out—we depend very much on the land wildlife.

I'd like to start with an animal that's not so much wildlife and actually probably domesticated and that's the reindeer. There's about 20,000 head of reindeer on the peninsula, divided among 17 to 20 herders. This particular resource is most important to us and a lot of times, the heavier populations of the reindeer are in the Kuzitrin area due to its grazing capabilities.

The herd—and I'm trying to fill in for somebody that's not here right now who was going to speak only on reindeer. But this particular animal is really important to us, not too much of it to my knowledge is exported outside of the region, although some of it is. Most of it is used within the region at a considerable lower cost than buying beef from the market. It's about half the price, plus all the parts of the animal are used. But the reindeer herd—we'd like to have continued access to the herds and people living on the peninsula would like to have continued reindeer. There is a market for the horns which is in the process of being established over the last few years and this is relatively new. It helps the herder cut into his herd less so that perhaps his herd might grow.

Now, I'd like to leave reindeer for just a moment here. The moose populations have been increasing and over some of my trips, I find them to be of increasing value to the people of the area, including the people at Nome. These type of things are difficult to measure when you're supplementing your income, whatever it may be, and you can take any one species in the area and show that we're not primarily dependent on that one particular species. I'd like to also add that a trait of sharing of food with somebody else that needs it still continues today. In other words, the hunter shares with his grandparents and perhaps with a sister and so on and I'd like to make one example that I remember when the—during the Nome storms when the King Island village was literally wiped out, that they received seafish from Kotzebue due to this traditional sharing. And this type of sharing is really important and the upper reaches of the Kuzitrin have vast resources of whitefish which are taken by not very many people, but nevertheless are taken in great quantity and although it looks like only a few people are harvesting this resource, it usually turns out that they're sharing and I know a lot of cases where, particularly in the fall and winter, that whitefish from the Teller area are shared by people in Nome.

I'd like to interrupt myself again and say that as the Native Corporation, we have concentrated over the last 5 years on technical matters of land selection and other items of similar nature. We have not had time to properly assess in writing the extent of our resources, including wildlife and mineral, and our corporation in particularly is just starting to embark upon a land use plan and the reason we're doing this is that we'd like to decide what we want to do with our mineral resource, so that perhaps we're a couple years behind what we should know in order to present to a hearing like this. Now, at this point, I'd like to have access to the map to point out some of these areas and villages, if you don't mind.

Mr. QUARLES. Please do.

Mr. ATUK. The 80-percent figure—I think we need to clarify that a little bit, but Shishmaref, Diomede, Wales to St. Lawrence Island, Gambell and Savoonga, Brevig, Teller, Nome perhaps use—rely 80 percent upon the sea for their natural subsistence state. That figure changes, however, when you get to White Mountain, Counsel, Golovin, Koyuk and Shaktoolik and further down here, we have Unalakleet and Stebbins and St. Michael. Stebbins and St. Michael and possibly Golovin perhaps depend more heavily on the sea than the rest, but White Mountain and Koyok, particularly, are very much dependent upon the land resources. I don't think that this 80-percent figure would apply. Perhaps it's more like 50 percent or 40 percent. Like I say, we just don't have enough figures on the wildlife resource value to us. The Kuzitrin River is very important to the Nome residents for moose hunting and it is our position that this activity is very important for a lot of the people of Nome when you stop to consider that many of these people have moved in from the village—still have those traits and are often out of a job. But not only for moose is this river important, but for the whitefish, I really can't describe their numbers except that when they're migrating, they migrate for days and you can see them outwards to about 5 feet. The other species that is valuable is the pike, and I think it exists in this river.

For some of the local people, pike fishing in this Kuzitrin River is important so that the corporation would recommend that the boundaries be moved up to the lava floes up here and our use of that particular drainage is for these purposes. I don't necessarily see where the use would increase beyond that and there's other means of precluding a build-up in there. I wanted to mention also that these other villages that depend upon the sea mammals using the 80-percent figure also depend on the land for fox hunting and fox trapping and these are the villages of Wales, Shishmarof, Brevig, and Teller. The fox are very numerous and this type of activity does take place, usually in the wintertime. This is primarily a duck nesting area in the summertime and I believe that's the purpose for which it was withdrawn. Now, the people are intrested in the foxes in the wintertime when the ducks are gone for the 9 months. We see no conflict and we recommend strongly that if this does indeed become a park that snowmachine travel be allowed and that hunting and trapping of the fox be allow. The people in the area know a lot more about the fox than I can tell you—its migratory habits, its population increase and decrease. They not only live on the land, but they migrate far out into the sea at times, particularly the white fox. This is another area and another species that we just don't know enough about at this time.

One more area I'd like to just mention briefly is Mary's Igloo since this is in that area of ecological reserve. This particular area is used quite heavily by the people of Brevig and Teller, particularly in the lower reaches and within these two river drainages. The other parts of it are reached from the road which is quite close to the Pilgrim Springs. The Pilgrim Springs receives quite a bit of attention. This area generally is not only reflected by the Mary's Igloo Native Corp., but is used quite a bit by the people of Teller and Brevig for its wildlife resources. Thank you.

Mr. QUARLES. Is there anyone else that wishes to cover wildlife?

Mr. NEWMAN. Stell Newman, National Park Service. Just a couple of quick points to fill in some of the areas that didn't really get covered. One is that on the northeastern coastline, there is a section of cliffs, some of it bluffs, where we do have cliff birds of some density. The other point is that when Mr. Gravogel was talking about the muskox, the one herd is outside the proposed preserve area, one herd lies within the boundaries of the subcommittee print and partially within the boundaries of the administration proposal. The herd ranges throughout. The other point is that the waterfowl that has been discussed tend to occur in areas where you also have the paleonthological deposits and the two are not any problem with one another.

Mr. QUARLES. Are not what?

Mr. NEWMAN. Are no problem. In other words, the preservation of the waterfowl will not harm access to research on the paleonthological——

Mr. QUARLES. Presuming that they do it in different seasons?

Mr. NEWMAN. Well, that could be done or—it actually would be a rather limited impact at a particular time. Then to kind of draw this together, what you've heard from the people here about the mammals and the birds again emphasizes the historical role of this area as a relic of a much larger land bridge over which life came in the past. In a study done on the biology of this area, Herb Melchior of the University of Alaska sums it up by saying that—some 23 genera of mammals migrated across this land bridge and that the present landscape is very similar, both in plant type and land form, to the kind of terrain and vegetation present. Consequently the habitats which exist now are essentially the same as those which exist noew are essentially the same as those which existed across the land bridge at the time of mammalia dispersals. Thus the populations of mammals on the Seward Peninsula may represent a historical link with the past of western Alaska and eastern Siberia.

Mr. QUARLES. Any other thing on wildlife?

Mr. SHANKS. Yes; I'm Rollin Shanks and I'd like to speak for myself for a minute. I've spent two summers on the Seward Peninsula and I'd like to add to some of those things Richard said. I've been in almost every village in the Seward Peninsula at least for some short time and the people in the villages are very dependent on the resources coming off the land. This 80 percent figure, I think, may hold true for some of the protein, but it's important to remember that they also eat greens, berries and other things that come off the land. I would hope that nothing in this Act would preclude continued use of the area for their subsistence lifestyles.

Also, Jules Tileston of the Bureau of Land Management asked me to make a small comment about the reindeer herding. Currently, the Bureau is managing the Seward Peninsula as a reindeer range. The entire peninsula is under lease to one leasee or another and this is also very important. The Bureau classifies it as being a subsistence industry almost because it's generally a small industry that can be carried on in the village as the herds are established, there's a minimum outlay of cash involved, and it's a very good industry for the village. It also does tend to serve people during times of low productivity by the surrounding areas by supplementing the red meat in the area. It's also very important cash economy component for many of the people in the villages. They earn a good part of their yearly income by being a reindeer herder or something of that sort.

Mr. QUARLES. Any other comments on wildlife? Quickly, then, let's move on to Renewable Resources.

Renewable Resources

Mr. NEWMAN. Stell Newman, National Park Service. Under this section—Renewable Resources or Use Patterns?

Mr. QUARLES. Renewable Resources, but if you wish to speak to subsistence——

Mr. NEWMAN. Yes.

Mr. QUARLES. OK, go ahead.

Mr. NEWMAN. The National Park Service has conducted extensive reseach in subsistence over the years and in this particular area, one of the University researchers spent some 6 months in the village of Shishmaref studying subsistence that related to the proposal area. The full report can be made available if you wish and as a matter of interest, we also have reports on every other park proposal in the state with the exception of Noatak and Glacier Bay whose two will be forthcoming.

Mr. QUARLES. I think we'd like to see that Shishmaref report, if for no other reason, that's one of the places we held our village workshops this summer.

Mr. NEWMAN. OK.

Just to back up what you've heard from Mr. Atuk and others, subsistence plays a very important role in the livelihood of the residents here. The people who are primarily concerned with taking resources from the proposed reserve live in the village of Deering on the eastern side, Shishmaref on the northwest, and Wales down on the tip. The other villages also use portions of it, but not to the same intensity as these villages. The heaviest user would probable be the village of Shishmaref. From the land, we've heard of moose being taken. Also taken are extensive collections of berries and the very important greens which are preserved and sealed off for winter use. The people are mainly dependent upon the sea for most of their resources. I would urge you to strike from your minds this eighty percent figure I keep hearing bandied about. There's one thing that our work in the state on statistics has taught us is that subsistence is a variable thing. It changes both in geographical distribution and in time in terms of its nature. So 80 percent might be a good figure for Shishmaref in 1977. It won't be good for Shishmaref in 1978. It will vary, so don't get hung on arbitrary figures.

Primary dependence is upon the sea in the vicinity of the preserve, but there is also extensive use of the land and its products. Now, in terms of present use patterns, I'd like to also add to some of the discussion on reindeer herding and I've been fortunate to have worked with the herders and gone on a number of their herding activities. Reindeer herding occurs all over the preserve, and the herds are not limited by fencing or anything else.

They're relatively free to move. The herders can move them and the herds have additional areas on the peninsula and in the preserve in which they move themselves. There are three herders, one in Deering, one in Shishmaref—he has a herd to the north and east, and one in Shishmaref who has a herd to the south. The other one is a herder in Wales who also has a herd which comes up into the westernmost portion. About 8,000 or 9,000 head presently are in the preserve.

They're very important to the local residents, not only in Deering, Shishmaref, and Wales, but also other villages on the peninsula. The meat is almost entirely used by residents of the Seward peninsula. It's important to remember here that your diet with steak and baked potato and salad and that kind of thing, hamburgers, is not the same diet as is current and common here. Meat is much more important. Meat is extremely important up here, both for tradition's sake and for the winter energy which it gives, so the importance of meat assumes a paramount role in what people need up in this area.

Reindeer herding in providing a supply of meat stored on the hoof is extremely important to the well-being of these villages. The meat is sold in the villages for a dollar a pound or less. When a chicken—in a village store will run you $7.50, you can see the advantage. Also, a very important exchange takes place in the villages where you do have the problem of low cash flow. People in the villages will participate in the herding operations, helping round up, helping in butchery, helping in de-horning, and in return for that labor will be paid in meat. So it's a non-cash flow situation in which they do get a supplement for their meat needs. One final thought, is that in terms of the boundary discussions, I think it's really important to remember that it isn't so much where you draw the line as it is what uses would be permitted within the boundaries.

So where you've heard concerns about subsistence and sport hunting, the proposals presently before Congress would all permit subsistence sport hunting.

Mr. QUARLES. They would also permit reindeer.

Mr. NEWMAN. Also permit reindeer grazing.

Mr. CLIFFORD. Yes, Bert Clifford with the Soil Conservation Service. Again, I would like to back up some of the expert testimony that you've heard about the reindeer industry. We, as an agency, have been involved the last years working with the NANA Corporation and the Herders Association in doing some site specific work on the Seward Peninsula. We concluded in 1976 4½ million acres of range survey, basically in cooperation with NANA, but also with some of the herders on the Seward Peninsula. We've been contacted by the Herders Association to basically complete the rest of the peninsula as far as a rain soil site survey is concerned. Ten-and-a-half million acres. I want to suggest to you that in 1976 when we did this survey, we're using another new method that does give reliable information. This basically uses Landsat imagery to identify range sites on the ranges. This could be a very reliable process. Running this through a computer, after only spending a—months in the field with two range specialists, Landsat specialist and a soils man, we were able to complete the 4½ million acres on the present four leases that we are working with the corporation on. This basically gave us a field survey of range sites and range conditions and soils for identification and mapping.

As far as range is concerned, this gave us range determination for the key plants and also the range conditions. We are presently in a planning context with the NANA Corp. and four other herders to develop grazing plans. One thing that is of interest to us and both the corporation and the herders is that on the present work that we'be done on the Seward Peninsula, it appears that with management, that they might be able to quadruple those herds. I'm not saying that's going to apply throughout the Peninsula, but with management. Now, without management, maybe (indiscernible) is about right——

Mr. QUARLES. Excuse me, what do you mean by management?

Mr. CLIFFORD. Basically, this is identification of winter and summer ranges and applying the herding techniques to utilize these ranges in a safe way. Right now, they're pretty much free roaming.

Mr. QUARLES. Well, we were told when we held our village workshops that they're very difficult animals to herd.

Mr. CLIFFORD. They are very difficult and one thing that's happening is that the herders and the corporation are making a very diligent effort to apply the herding techniques. They have committed themselves to a management scheme that will allow them to maximize as far as the industry is concerned the safe utilization of the range. As far as the range is concerned and the grazing plans that we're working on with individuals, we plan on following up each year after the grazing period is over with field checks to find out if the grazing effect is substantial and whether the analysis that we have made on the ranges is one that is a proper determination. Either high or low, basically to support this. This has not been done to an extensive extent in the past that we know of.

As part of this, we're doing snow condition surveys in the wintertime to find out if the winter ranges are the limiting factor the herds on the peninsula. Our range specialist has completed the basic groundwork. One of the management assistants gave us a run-down on this and showed us that by grazing winter ranges in a rotation process, they could quadruple their numbers. Without it, they might be about where they are right now.

Mr. QUARLES. Your're talking about only herding techniques. You're not talking about a massive fencing program.

Mr. CLIFFORD. Right. Only herding techniques and that's all they're doing. This will give you an example of one of the range plans that we were looking at. The range conservationists had pretty well allotted four grazing areas on which they would manage by herding. Every fourth year they would be back on the new range. So this allows the range to develop and maximize the production. We suggested this to the herders and the owners of the herd's as the first opportunity to maximize their management goals. As mentioned previously, the peninsula is blanketed with reindeer grazing permits. This proposal does—directly affect several of the grazing permits. We do not know what will become of the reindeer industry, but presently the industry is growing and is in a very positive attitude by both the herders and the corporation.

Mr. Bevinetto. Excuse me, how many grazing permits did we say were up there?

Mr. Atak. I said 17 to 20.

Mr. Clifford. And at present, we're working with four of these permits.

Mr. Bevinetto. Are there grazing fees associated with the permits?

Mr. Atak. Not at the present. It used to be that the BLM let them out on a 10-year basis. Now they're on a yearly basis until the land actually settles.

Mr. Clifford. As they've mentioned previously, then, they are not meeting the market potential. Most of the meat is used right on the peninsula and the herders feel that they do have an excellent potential. But, one thing that we might suggest out of this is that the meat is being used on the peninsula. This is subsistence in its finest form. I think that the community ought to be well aware of this.

One thing that was also brought to our attention is that the herders spent some time in Russia this fall looking at the herding techniques that are being exercised there. They came back quite impressed and pleased with what they found. What they're doing is really in the right vein, and they feel that there is a success that is being developed in the industry. Anyway, I said all this only to summarize that as long as managers can develop such an industry that every reasonable opportunity must be made to allow the industry to grow in an environmentally safe manner. This is really the first concern of both NANA Corp. and the Reindeer Herders Association.

There is not another livestock industry or art that can be exercised on tundra ranges that can be a reliable success and this is especially true because they do not have to have outside feeding. The reindeer are adapted to this ranges, and so, again, they must be given the opportunity to expand as it can be justified. I would suggest to you that a major tie-up of tundra ranges would not only be limiting factor to put a final limitation on the reindeer industry on the Seward Peninsula, but also anywhere in Alaska where it can be justified.

Mr. Quarles. Did you have your hand up?

Mr. Gravogel. Just a point. I don't know that it related to the subsistence industry of the reindeer. The BIA supplements the industry to the tune of about—it was $80,000 a year and the appropriation has just gone up to about $120,000. I'm involved in it somewhat, only on a cursory basis. It's primarily used to provide for administrative duties and some research activities out of the University of Alaska and to coordinate meetings, but the government does subsidize the industry to some extent.

Mr. Quarles. Anything else on this?

Mr. Newman. Just one minor point that I forgot to mention. This was that the Park Service has funded a 2-year socioeconomic reindeer study for this area that has just been completed. The printed copies are in Fairbanks.

Mr. QUARLES. Who did this study?

Mr. NEWMAN. It was done by the University of Alaska for the Park Service and it's just been completed and it discusses the socio and economic values of reindeer herding for the Seward Peninsula, in particular, and also as far as Cape Kruzenstern.

Mr. SHIVELY. Mr. Chairman, John Shively with NANA Regional Corp. I don't want to be redundant, but I do want to indicate that I think we have made a major commitment to the reindeer industry as has already been indicated. We feel that it has a good opportunity to take the place of some of the other meat products that are now coming in short supply such as caribou and whale as a major food subsistence basis for out region. We've been in the reindeer business for about 3 years.

Our annual budget is a hundred to a $130,000 of NANA's money for the reindeer operation. We're at this point not in a position where we're making a profit out of the reindeer operations, although if it does grow and expand, we would expect to make some profit. However, the main idea behind the development of reindeer is to provide an alternate meat source for the region. I know that in H.R. 39, there is language that does allow the continuation of reindeer herding in this area and we would hope that the Senate would continue that language.

Mr. QUARLES. Yes? This will have to be the last dialogue.

Mr. MAUER. Okay. Fran Mauer with U.S. Fish and Wildlife Service. I thought it would be appropriate at this time to advise the committee that the Service is currently funding a study by the Alaska Cooperative Wildlife Research Unit that is looking into the aspects and interactions of reindeer grazing with wildlife. This is a three-year study. Two years of the study are complete now and one more year is needed to complete the study.

Mr. QUARLES. We have discussed the forage portion of Renewable Resources. Is there anyone—does the State want to give us whatever statistics there are on timber and agriculture?

Mr. WICKES. We find there is no potential on a statewide basis for either agriculture or forestry, although I believe there's been some historic agricultural production around Pilgrim Hot Springs to the south of the proposal for local consumption.

Mr. QUARLES. Okay. Does anybody have anything else? Yes?

Mr. ATUK. I'd just like to tell you what we've been thinking about, at least in one village corporation. There are quite a few berries around, particularly the salmonberry and that there are a couple companies in Alaska that do take these berries and make a jam out of them. In some places, this is a major part of not only the people's diet, but there is potential, Shishmaref, is one of these, that possibly in the future, this resource that could be harvested, particularly as it renews itself. Production wouldn't seem to have any effect on the future existence. It probably would develop it, so I think that this should be kept in mind.

Mr. QUARLES. Any other comments on agriculture? In that case, the land selections situation.

State and Native Land Selections

Mr. WICKES. Thank you, Mr. Chairman. Jim Wickes, Department of Natural Resources. Within the Andrus land bridge proposal, there are no State lands. There are no State interest areas, either. Immediately to the south, however, there are two areas which the State is interested in making selections. For the record, these are interest areas number 60 and 61. Number 60 is found in the Imuruk Basin area. There are some outstanding wildlife values that are of interest to the State as well as some mineral potential. In addition, the area as drawn now extends over near the village of Teller which is a potential OCS site. The State, in that case, would be interested in selecting land which the Native Corporations, through their selection process, do not obtain.

We're also interested further out on the peninsula tip in the Lost River area in some hard minerals lands there, tin and tungsten. It looks like a very productive mining area in Alaska. Within the Secretary of Interior's proposal, we estimate that the final Native holdings will range somewhere around 48,000 acres. That represents some 2 percent of the entire proposal.

Mr. SILVER. Jim, some of that State interest area is in the Andrus AEC, though, isn't it?

Mr. WICKES. Yes, you're right.

Mr. QUARLES. Any other comments on State and Native selections?

Mr. ATUK. I'd just like to comment on the islands that were excluded from this discussion but that are still on the maps. It's our position that Fairway Rock, which is between Diomede and Wales, is selectable by Wales. That particular little dot on the map was omitted by many of the maps. Sledge Island which is just off of Nome is one that the Regional Corporation is very interested in. We're working on ways to acquire this particular island. The third one, below Shaktoolik, is Besboro Island. This island is about six hundred twenty-five acres and only part of that is selectable by Shaktoolik. the southern two-thirds, approximately, lies within what could be Unakleet's withdrawal, but it was not withdrawn. We're also interested in this portion of the island and we're looking at means to find a way to acquire it for the Native Corporations.

Mr. SILVER. One other question. Can someone from the administration tell me if the AEC's have a specific mileage boundary or are they drawn on an individual basis?

Mr. CONTOR. Roger Contor, National Park Service. As far as I know, they're all 6 miles.

Mr. SILVER. Thank you.

Mr. QUARLES. Any other comments on this?

Mr. GREIST. The NANA Regional Corp., Bert Greist. We've got about 20 selections within the Interior's boundaries just southwest of the village of Deering.

Mr. QUARLES. All right, then can we move on to energy values?

Energy Resources

Mr. Wilson. Tom Wilson, Division of Geologists, Marathon Oil Co., and representing Alaska Oil and Gas Association. I'll address my remarks to the northern part of the Seward Peninsula. This proposed Chukchi-Imuruk-Shishmorck, area and the Selawik wildlife refuge. Would it be appropriate to take that in the same basin?

Mr. Quarles. Certainly, if you want to just complete your presentation, that would be fine.

Mr. Wilson. Well, these four wildlife refuges on the north coast of the Seward Peninsula and east of Selawik Lake include the alluvial covered lowland areas that are within portions of the Selawik sedimentary basin. Now, this basin is mostly offshore in Kotzebue Sound. It includes nearly 3,000 square miles of onshore land and water bottoms in the delta areas of the Kobuk and Selawik Rivers and the coastal lowland along the north side of the Seward Peninsula.

Offshore seismic information indicates the basin may contain in excess of 10,000 feet of moderately deformed strata of probably Tertiary or Cretaceous age. Two wells have been drilled in the area, abandoned in 1974 and 1975. They encountered over 6,000 to 8,000 feet of such sediments and geologic field studies north of the lowlands. In the Selawik area, they established the presence of Cretaceous sediment in excess of 10,000 feet. The abandoned exploratory wells, by the way, were the Imuruk Point well, located near Kotzebue, and Section 44 of Township 16 North, Range 16 West, Kateel River meridian drilled to a total depth of 6,311 feet. The Cape Espenberg well located in the north coast of the Seward Peninsula in Section 25 of 12 North, 25 West, Kateel River meridian drilled to a total depth of 8,373 feet. There have been reports of marsh type gas seeps and unconfirmed oil seeps within the basin area in published literature. The oil industry has conducted a number of geological and geophysical surveys in the area in the past few years, some of which were offshore, some of which were onshore. Some of this onshore information was part of a commitment to the Native Corporation contract to help with their land selection processes. Exploration and development of the OCS area—and the basin onshore lands should be taken into consideration. Sites for onshore facilities and transportation corridors will certainly be needed.

Mr. Quarles. Anyone else on energy resources?

Mr. Smith. I'm Dave Hederly Smith with the Alaska Miners Association. I just noticed this morning that in the Udall proposal, the Fish River Basin is included. There's very good uranium potential in this area. The basin is unique in that it's surrounded by known uranium-bearing granitic rocks on all sides. It has Tertiary sediments in it which have not been mapped but are identified by coal-bearing float in the streams that are flowing in the basin and—the placer uranium in streams actually does show up on airborne mass spectrometer surveys flown across the basin. That's from our own company data. This area would probably be undergoing extensive ground geophysical drilling right now except that it is (d)(1) land and (d)(1) land on the Seward Peninsula has been selected by the Bering Straits Natives under 14 H 8, so right now, the land status has been up in the air or I think my company would have brought a client in on this ground. But it has very good uranium potential and that's about all I have to say.

Mr. QUARLES. Yes?

Mr. HOFFMAN. Barry Hoffman, Alaska Miners Association, and I'd just also like to mention again that the Fish Creek and McCarthy's Marsh Basin does have an excellent uranium potential. Also, there are several known uranium occurrences near the marsh in sedimentary rocks and we feel that this is a very highly prospective area. Also, I would like to point out that the area to the east of the Taylor Highway has another potential Tertiary basin. It's been just briefly evaluated. There are known coal-bearing sequences there and this also has some uranium potential.

Mr. QUARLES. All right. For our benefit, are most of these uranium lands selected areas?

Mr. SMITH. Actually, they're (d)(1) lands, but they've been overstepped with 14 H 8. Right now, they're not——

Mr. QUARLES. So most of them lie between the Andrus proposal line and the H.R. 39 line?

Mr. HOFFMAN. Well, on that map behind you there—is a blue line. It's just the area to the south of the blue line.

Mr. QUARLES. Anyone else?

Mr. MULLIGAN. Bureau of Mines. Is it proper to go on with other forms of energy at this time?

Mr. QUARLES. Certainly.

Mr. MULLIGAN. I'll start with the geothermal areas. There are three—geothermal power has been proposed to supplant fossil fuels as a source of energy on the Seward Peninsula. The proposed geothermal sites include Pilgrim Hot Springs and the Serpentine Hot Springs. And another potential geothermal site is the lava beds area. These are on the map which we'll be putting in as testimony. In regard to coal, this is doubtful. A basin largely covered by tundra underlies the area west of the lava beds. Some lignitic coal exposures have been reported at widespread localities. It's possible that coal beds underly a significant portion of this basin. Drilling would be required to conclusively determine if coal is present and if so, it is of a grade and quantity that would have value for local power and heating. This same basin is the one mentioned as having a potential for uranium. I also mention that there is some potential for uranium in the Cape Espenberg area and on the south side of the proposed withdrawal areas. That is on the north side of the Bendeleben Mountains. I think the other sources have already been adequately covered.

Mr. IMESON. Excuse me, could you tell me again how many geothermal areas there are in the Seward Peninsula?

Mr. MULLIGAN. On the total Seward Peninsula? I might not get them all, but there's Serpentine Hot Springs, Pilgrim Hot Springs, possibly the lava beds, then there's a geothermal area at the head of the Fish River valley, there's a geothermal area north of Elim, there's another geothermal area in the western side of the Tubutulik and there's another geothermal area on the south side of Granite Mountain.

Mr. IMESON. Okay, how many of those are inside the Andrus proposal?

Mr. MULLIGAN. This particular Chukchi Imuruk proposal?

Mr. IMESON. Yes.

Mr. MULLIGAN. Two or three. Two in the Andrus proposal. The Pilgrim Springs is in the area east of Teller that's of ecological concern.

Mr. IMESON. All right.

Mr. QUARLES. Any other comments? Yes?

Mr. HOFFMAN. I'd also like to bring up a few other points on uranium. We've talked about—I'd like to talk about the uranium in intrusive and metamorphic rocks. To the northeast—or northwest of Serpentine Hot Springs are active uranium claims. There was drilling last year and there will continue to be activity. We consider most of the intrusives and the metamorphics in the Kigluaiks and the Bendeleben Mountains and Darby Mountains to have uranium potential. There are numerous low-grade uranium shows in the area and this area has been identified by numerous government agencies as a significant uranium-bearing area.

Mr. SILVER. For the record, are those in or out of the Andrus proposal?

Mr. HOFFMAN. Most—the one at Serpentine Hot Springs where there are active claims, are in the proposal and most of the other areas are outside the Andrus proposal.

Mr. SILVER. Thank you.

Mr. BANNISTER. One more additional statement?

Mr. QUARLES. Certainly.

Mr. BANNISTER. In regard to active uranium claims, there is a claim group just south of the eastern corner of the Andrus proposal in the Bendeleben Mountains. I will point it out now. It's right in this area.

Mr. QUARLES. Thank you.

Mr. WICKES. Mr. Chairman, Jim Wickes, Department of Natural Resources. The extent to which the Andrus Bering Land Bridge proposal coincides with the upland basin for oil and gas comes to around two hundred and seventy-four thousand acres. That particular area is rated in the ninth level on our scale of ten for oil and gas potentials. It doesn't appear to be a very high prospect so far.

Mr. QUARLES. Any other comments? Yes?

Mr. MAUER. I thought I might comment on another point of energy that probably has not been discussed too much so far and that is wind. Some of these coastal areas of Alaska are extremely windy areas. There is a Federal Energy Administration funded wind generation feasibility study. I believe Kotzebue and Cold Bay have been identified as study sites. Indications or data on wind in those—at Kotzebue, as I recall, has an average daily wind velocity of something like 10 to 15 knots. This may be a very interesting alternative to energy in remote areas of Alaska where there are problems of getting fuel and such things as coal in these areas.

Mr. QUARLES. I assume most of these would be on or near village sites?

Mr. MAUER. Right, that's what they would be in, yes.

Mr. QUARLES. Any other comments?

Mr. ATUK. I'll just mention that there were power withdrawals in the Tuksuk Channel and Imuruk basin area within that area of ecological concern that indicates some energy resources through water power.

Mr. QUARLES. Any other comments on energy resources?

Mr. NEWMAN. Stell Newman, National Park Service. I'd like to submit a report by Dr. Robert Forbes from the Institute of Geophysics at Fairbanks on the two wells for your information. Basically, it just says that the prospects look much better offshore than onshore. Also, a comment on the coal, the information that we've been able to gather on the coal in this Kougarok gravel area is that it's a lignite and the report says that because it consists of lignified wood in friable sedimentaries and because the overlying gravel is loose and uncemented, the Turner Creek lignite would be difficult to mine. This is all the information we have.

Mr. QUARLES. Any other comments?

Mr. WILSON. Tom Wilson with OGA. I just wanted to comment on the priority system that the State has. I thought it might be appropriate. Their rating is, I think, based primarily on the fact that there's very little known about the area. This should be included in the record.

Mr. QUARLES. Yes?

Mr. MULLIGAN. John Mulligan, Bureau of Mines, regarding the possible value of oil, it should be realized that even a very small amount of oil would be of great value in this area to the villages. Witness the gas at Point Barrow which is really a vary small field.

Mr. QUARLES. Any other comments? In that case, we'll go on to nonfuel minerals.

Nonfuel Mineral Resources

Mr. HUDSON. Travis Hudson, U.S. Geological Survey. Mr. Chairman, two studies have been completed on the Seward Peninsula and they are available as USGS open file report 78–1C. Level III studies have not been started, however, for local areas. Studies comparable in detail to level III and to level IV are available. Our three areas of mineral resource potential were included within or overlap all proposed withdrawals. These are the Serpentine Hot Springs area, the Bendeleben D–5 and D–6 quadrangles, the eastern part of the withdrawals between Kotzebue Sound and the Bendeleben Mountains, and the southern part of the withdrawals, most of the Bendeleben Mountains. In addition, there are three other general areas of mineral resource potential that are included or overlap with the larger proposed withdrawals which are primarily south of the Bendeleben Mountains, mostly in the McCarthy Marsh area, including parts of the Kigluaik Mountains and adjacent lowlands of Imuruk Basin and parts of western Seward Peninsula inland from the coastal plain. All of these areas are delineated on the 1:1,000,000-scale map that you have in front of you as a supplement to our level II studies.

With respect to the Serpentine Hot Springs area, there are three identified load zones of tin and related mineralization. Additional zones are probably present. Placer gold and cassitorite deposits are present on Humble Creek. These have been locally but incompletely mined prior to World War II. Hydrothermal uranium mineralization may be present in some parts of the area. The area of principal mineral resource potential can be identified at

1:1,000,000-scale because the studies are of sufficient detail in this area. I've done that on another map that I submit as a supplement to our other two studies right here. With respect to the eastern part of the proposed withdrawals, there are three mineral resource potential areas that were identified in out level II studies. These are areas number six, seven, and eight on the map you have. Area six contains at least one important strataform lead-zinc deposit and it's an important placer gold district. Additional lead-zinc or lead-silver deposits are present and some lode tin and uranium mineralization may be present. We've estimated that there is a ninety percent chance that the area contains one or more lode gold deposits, a 50 percent chance that the area contains four or more such deposits, and a 10 percent chance that the area contains eight or more.

Mr. QUARLES. Let me ask you one question. You're talking about the entire area, seven, for instance——

Mr. HUDSON. Yes.

Mr. QUARLES. Not just that——

Mr. HUDSON. That's right. Some of the lode gold deposits may have tonnage and grade characteristics of the vein gold model that's been used in our level II studies, but some and possibly all deposits don't. The area is somewhat unique in that placer gold has been recently mined by essentially underground methods for most stream gravels that are now buried by the basalt flows. Area eight contains newly discovered contact mineral iron and copper deposits. We estimate that there's a 90 percent chance of one or more such deposits, 50 percent chance of three or more, and a 10 percent chance of seven or more. We will not have a tonnage and grade model for this type of deposit. The area contains a few placer gold deposits, lode gold deposits are probably present, and it may contain stratiform lead-zinc-silver deposits. The contact metamorphic iron-copper deposits are within and adjacent to proposed withdrawals. They are characterized by distinctive aeromagnetic anomalies and these anomalies define a belt that extends southeast into and within proposed withdrawals.

Now, area seven is a large, mostly unexplored region. It has at least one important vein of replacement lead-silver-zinc deposit, two placer gold deposits, and the potential for stratiform lead-zinc deposits, lode gold deposits and copper-bearing contact metamorphic deposits. We estimate that there's a 90 percent chance of 3 or more vein or replacement lead-silver-zinc deposits and a 50 percent chance that there are 11 or more such deposits.

We do not have criteria for estimating the number of deposits at the ten percent confidence level, nor do we have a tonnage-grade model for this deposit type. Resource potential in this area is defined primarily by the presence of geologic units and relations similar to those in areas number six and eight. Especially important to identifying the boundary within the proposed withdrawals is a presence of an aeromagnetic anomaly similar to one that is associated with contact metamorphic deposits in the area number eight. This anomaly is located just east of Imuruk Lake. Last summer, we identifed sulphide-bearing tactite at Granite Bay on the east side of Imuruk Lake.

Another important relation that's pertinent to the planning and resource potential of area seven is the presence of Mississippian fossils in the northern part of Kotzebue Sound. Mississippian strata are host rocks of stratiform lead-zinc mineralization in some areas north of Kotzebue Sound and it is possible that these strata are present in parts of area seven. We turn to the southern part of the proposed withdrawals. These parts include large parts of the resource potential area number twenty-seven in the Bendeleben Mountains. Area 27 is largely unexplored. In the mountains there's potential for a variety of base and precious metal deposits, for uranium, and possibly for tungsten. Lignite has been produced for local purposes. The potential for these commodities is not evenly distributed in the mountains. Deposits of the metallic quantities are most likely in the western Bendelebens from about Boston Creek west to the Nome-Taylor Road. This condition results from differential uplift of the mountains and deeper crustal environments are exposed in the east and shallower crustal environments are exposed in the west. The shallow environments are more commonly associated with mineral deposits and it is the western part that is known to contain many geochemical anomalies and some (indiscernible).

Now, in order to facilitate the use of our level II studies, I've transferred to boundaries of the resource potential areas that are around the eastern and the southern part of the proposed withdrawals to a 1:250,000-scale map. On this map, I've also subdivided area 27 in order to show that part more likely to contain mineral deposits. I submit this map as an additional supplement to our level II studies. Parts of resource potential areas 19, 30 and 31 are included in larger proposed withdrawals. These are basically the areas that have just been referred to as having potential sedimentary type uranium deposits. These areas are restricted to continental sedimentary basins that on the basis of their geologic setting are considered to have this potential because area 19—this is the McCarthy's Marsh area—is the deepest of these basins and because it has the most clearly defined relations to adjacent source terrains, it may be more likely to contain deposits. Parts of resource potential area 24 may be included in some proposed withdrawals. That part of area 24 nearer to the Bendeleben Mountains is an important placer gold district. A dredge is now operating at the mouth of Ophir Creek. We feel that lode gold deposits are likely to be present and that there is potential for stratiform lead-zinc deposits in this part of area 24. In the Kigluaik Mountains, the westernmost part of area 27, large amounts of graphite are present in schist on the north side of the mountains. Interior parts of the mounains are largely unexplored, but are considered to have some potential for base and precious metal deposits, tungsten, uranium, and fluorite.

Now, some of the withdrawals include large parts of area number one in the western Seward Peninsula. This area contains tin and related deposits, uranium deposits, and placer and lode gold deposits. Serpentine Hot Springs is in the easternmost part of this area. The parts of the area that appear to be in conflict with some of the larger proposals are in the northcentral and eastern parts. Within these parts, tin and related lode deposits are present or are most likely in the vicinity of Potato Mountain, Ear Mountain, Kouygarok Mountain, the Serpentine Hot Springs area, and the region between Kougarok Mountain and the Serpentine Hot Springs area, especially at the headwaters of Dick Creek and the area between Dick Creek and Washington Creek. In our level II studies, we estimated the number of deposits for five different deposit types within area one. But, because of the uncertainty as to how much of area one lies within proposed withdrawals, I would simply indicate to you that these numbers are available in USGS open file report 78–1C.

I'd like to conclude by indicating what some of the differences are between our level II studies and the map that has been used by the Land Use Planning Commission that's titled, "Locatable Minerals." That's map number ten in the folio. This map was prepared as an internal document by myself and several other survey geologists over about a 3- or 4-day period sometime last winter. It is meant to be a source of mineral resource information and was to be used primarily by survey staff in response to questions raised by Interior. It was not designed for the purpose of resource appraisal and it should be noted that the descriptive categories labeled A, B, C, and D do not necessarily represent rankings of mineral resource potential. Now, this understanding was originally conveyed in its note that accompanied the map. The Commission has colored A and B type areas and called them mineralized areas. Areas that are not colored are not mineralized. Now, this is one of the principle differences between our level II studies and this map, which we refer to as a terrane map. Many areas identified by the Commission to be nonmineralized on the terrane map show up throughout the State as areas of mineral resource potential in our level II studies. Most of these differences are associated with the areas that are labeled C-2 on the terrane map and this is a category of area where the geology is generally unknown and there are fewer known mineral deposits. On the Seward Peninsula, such areas as McCarthy's Marsh, Imuruk Basin, the upper Kuzitrin River drainage, the area east of Imuruk Lake are considered to have resource potential, but on the terrane map as shown here, these areas are implied to be not mineralized. Now, the terrane map should not be used to directly evaluate or identify resource potential. It's essentially obsolete and it's superceded by our level II studies.

Having just given you that plug for the level II studies, let me comment on what you may consider to be one of its problems. The level II studies, as presently available, do not directly rank or comparatively evaluate areas of resource potential, but they do summarize all the available resource information about the identified areas. Now, this information can be the basis for many different kinds of derivative resource evaluation. The Survey is willing to respond to questions concerning the level II studies because many resource potential areas are large and are partly included in proposed withdrawals. We urge that anyone with mineral resource questions about specific areas consult with us. Level II studies can be locally supplemented with more detail. Thank you.

Mr. QUARLES. Anyone else? Yes?

Mr. MOWATT. Tom Mowatt, Bureau of Mines. I would like to very strongly second Mr. Hudson's excellent summarization of the geology and philosophy attendant to mineral resource appraisals and I'd like to add just two things in passing. The speculative possibility for other types of mineralization to be related with the contact metasomatic deposits does exist and secondly, an innovative exploration concept seems to be in vogue in portions of British Columbia at the present time with respect to localization of uranium accumulations in relatively recent lava floes, I suggest that the uranium province on the Seward Peninsula combined with the presence of geoscenic lava floes presents another possibility.

Mr. QUARLES. Any other comments?

Mr. MCMICHAEL. Roy McMichael, Alaska Miners Association. I'd just like to add a couple of comments to what Mr. Hudson has already said regarding the geology and mineral deposits of the Seward Peninsula. There's two large areas in the proposed Bering Land Bridge National Preserve which are suitable contributions to the preserve. There are other areas, however, that contain significant mineral potential and should be clearly evaluated. The Hannum Creek property on the east boundary of the suggested preserve, located 25 miles southwest of the village of Deering, contains massive lead zinc mineralization, as indicated by surface and subsurface work. Soil and chip samples from the Hannum Creek property assayed as high as 3 percent lead, 1 percent zinc, and 2¾ ounces of silver per ton. Subsequent diamond drilling has revealed significant sulphide, the most noteworthy being a 13 foot intercept of 2.4 percent lead and a 3 foot interception of 3.4 percent lead and 1.24 percent zinc.

The Hannum area, which presently extends onto the withdrawn lands, holds a good potential for mineral deposit. The Hannum deposit is at the northwest end of the chain of lead and silver deposits known as the Kougarok River lead belt. The belt is approximately 55 miles long. It includes the old Hannum, Glory Creek and the Dry Creek prospects and an inactive mine at Independence Creek. Geology and style of mineralization of these deposits is similar. At least three major mining companies, including Cominco-American, actively explored the belt in 1977. In addition, several individuals are conducting gold placer mining operations near Unika village. At Independence Creek, another major mining company has considerable land holdings for a large, massive magnetite deposit. They have completed three short diamond drill holes which contain intersections of massive magnetite with copper values. This prospect turns onto presently withdrawn lands of the preserve. So as not to be redundant, I'll confine my comments to that.

Mr. QUARLES. Thank you. Any other? Yes?

Mr. CHADWICK. Russell Chadwick, consultant for the National Park Service. We did a survey on the Chukchi-Imuruk area, not the other portions of the possible withdrawals. The area at the time included the graphite deposits out south of Salt Lake and Imuruk Lake, and extended up east of the Taylor Highway to include the Serpentine Hot Springs and out east from there to the—at the far northeast corner of the Bilikin property, the copper-iron deposit, and south from there into the Solomon quad a little bit, then back out west to Pilgrim Hot Springs and Imuruk Basin. It included some 41 deposits. These are 41 groups of active mining claims or at least active on the record. Of the 41 groups, we found 7 which had a market value as defined in the terms of the contract with the Park Service, that is, essentially a value as a prospect or a property for immediate cash sale. There were some 10 prospects which were active largely based on recent geochemical finds but not by any means evaluated to date. The important prospects, in order of priority as I saw them, were the Bilikin prospect at the northeast corner, the copper iron deposit or mine, and the next one would be over at Serpentine Hot Springs where there's an ongoing uranium search. Then I think in terms of value, the Humble Creek placers in the Serpentine Hot Springs area. There are known past production from it and measurable reserves. The Kigluaik graphite deposits, which are perhaps the most important cubics, the long type, crystalline grapnite, in the United States. They are very little known, however. They haven't been much explored, so it still consists of in effect, a prospect. In addition to the reserves of cubic crystalline graphite, it probably has a like potential for flake graphite. The remaining three properties among the seven that were found to have some market value were two old patented groups which simply had today a real property value, nothing by way of prospects, and one property which was a geochemical find, but nervertheless had some visible mineralization and was better than those with simply geochemical anomalies. The report, I believe, has been submitted to the committee by the Park Service and that's all I have on it.

Mr. MULLIGAN. John Mulligan, Bureau of Mines. I'd like to give you at this time two copies of maps showing the deposits that have been mentioned. I'd like to emphasize that what we have on these maps are mining claims and known mineral deposits. This differs somewhat from mineral potential as explained by Travis Hudson.

Mr. QUARLES. Any other comments?

Mr. SMITH. Dave Hederly Smith with the Alaska Miners Association. I'd like to speak specifically about a couple of prospects in the Darby Mountain Range, in which my company, Greatland Exploration, has interest. We have probably eight to ten thousand acres staked in the Darbys. We wish we had quite a bit more. This is again an area included in Udall's proposal, but not in Andrus'. We have a molybdenum prospect in the Windy Creek that has service values up to seven-tenths molybdenite or molybdenum in the skarns and up to ¼ of 1 percent molybdenum in the molybdenum porphyry target area. It also has surface trace—geochemistry. It is suggestive of a moderate to deep level porphyry molybdenum. Again, this is in lands that would be withdrawn under Udall's proposal. Further to the south in the Darby Mountains, in 1976, my company discovered 13 new lead silver showings in the Darbys and from these showings, we have graph samples from tailings on them which contain up to 50 percent lead and 50 ounces per ton silver. That's an extremely high grade raw. We've done very limited work in this area, but we feel that we may have found a new lead-silver district similar to those we're developing in the Southwestern United States in the second half of the last century. We do feel there is some potential for mineralization being laid along volcanogenic deposits, which would be considerably bigger, but we haven't discounted that possibility and our work has been very reconnaisance nature. We expect there are many other showings in the area.

Mr. QUARLES. Yes?

Mr. HOFFMAN. Barry Hoffman, Alaska Miners. I'd like to point out a couple of additional areas, geochemically anomolous areas, particularly in the present (d)(2) lands, west of Mount Bendeleben in the Bendeleben Mountains. The State has done a geochemical study in there. There are numerous anomalies in the area for base metals, for precious metals, for uranium, tungsten, tin, and there are numerous gossan zones and color anomalies that have not been evaluated and if this area were open, it could receive extensive industry activity. I'd also like to mention the——

Mr. QUARLES. Just a second. That (d)(2) land west of Mount Bendeleben is not in the Andrus proposal, but is in the——

Mr. HOFFMAN. That's right.

Mr. QUARLES. Other than being in AEC of the Andrus proposal?

Mr. HOFFMAN. That's right. I'd also like to mention the gold placer potential in the Taylor—the Nome to Taylor Highway, particularly some extensive bench deposits that may be present there. This may be one of the largest unexplored gold placers remaining on the Seward Peninsula and that's a tremendous potential.

Mr. QUARLES. Any other comments?

Mr. MULLIGAN. John Mulligan, Bureau of Mines. I would like to point out that the gold deposits along the Taylor Highway south of the Serpentine Hot Springs area are one of the few resources that bring in non-government cash income to the Seward Peninsula which helps to supplement the subsistence income.

Mr. QUARLES. Any other comments?

Mr. ATUK. Richard Atuk, Bering Straits Native Corporation. I'd like to mention the fact that we have studied mineral resource potential in our withdrawals. These are shown in red on the map up there. We've not yet set a policy, but our study of the mineral potential indicates to us that although the Seward Peninsula has a high potential for lode mineral resources, these are relatively unexplored, primarily because of the vegetative cover, the permafrost problems, and the very complicated geology and we feel quite strongly that the (d)(2) area is even less explored or understood. We have submitted testimony that has to do with some of the areas along the Kougarok, including the Taylor area, and we can probably submit this information later on.

Mr. QUARLES. Fine, thank you. Any other comments? In that case, let's move on to Transportation/Access questions.

Transportation and Access

Mr. NEWMAN. E. Stell Newman, National Park Service. Just a couple of quick comments. The existing transportation system near the proposal consists of a dirt road coming out of Deering and up into the Salmon Creek area that has been discussed. Also, a very well maintained dirt road extends north from Nome up to the Kougarok area. There's also a road that goes from Nome up to Teller. Another point that needs to be brought forth is that, during the wintertime, when the area is all frozen and snow-covered, there is intense travel activity between the villages. Summertime it's difficult. You can go by boat or by aircraft, but during the winter, it opens up a low-cost, fairly easy means of going between Shishmaref and Wales and so forth by snowmachine and this is done quite extensively. There's also a fair amount of travel within the proposal itself by snowmachine in the winter, going from Shishmaref, particularly, to Serpentine Hot Springs.

Mr. BEVINETTO. Would you trace the wilderness boundaries for me, please?

Mr. GORDON. The wilderness boundaries cover the northeasternmost corner of the proposal, trying to avoid areas of travel between villages, and primarily, up in this area, secondarily in the vicinity of the lava beds.

Mr. BEVINETTO. About 600,000 acres all totaled.

Mr. QUARLES. Yes?

Mr. HOFFMAN. Barry Hoffman, Alaska Miners Association. I'd just like to point out that I think we've shown that the fringes and some part of this reserve has tremendous mineral potential and there will be continued development and excellent potential for mines in the area. Obviously, we need some way to get the minerals out and we're going to have to have road access, probably not access like across lava fields because they're very difficult to develop, but there should be some way to build into this any withdrawal or any National Park up here—some type of access where it's needed.

Mr. QUARLES. Thank you. Yes?

Mr. HEATWALL. Dave Heatwall with the Alaska Miners. I'd like to make some comments on transportation of Northwest Alaska in general. Something was overlooked yesterday. There was quite a bit of talk about the effect of transportation routes on the caribou migration and I'm not in sense of the word an expert on this, but I did some research last night and I'd like to read a few paragraphs here with the committee's permission.

Mr. QUARLES. I would hope that you could summarize it and just submit the paragraphs for the record.

Mr. HEATWALL. Okay. This is some work done by Mr. Angus Gavin who has spent since 1969 through 1976 on the North Slope studying the effects of the development of the Prudhoe Bay field and the pipeline corridor on wildlife in the area. I think this is probably the longest continuous study of the effects of the transportation corridor on wildlife that has been brought up, at least in this meeting. I have the results of his work up to 1975. His 1976 work is in publication right now, but basically he has concluded——

Mr. QUARLES. Excuse me, much of this was done before the completion of the pipeline project.

Mr. HEATWALL. It is continuing. The conclusions I have are before the completion, but the haul road was in, of course, in 1975 or the portion I have here. His conclusions show—if I may just read this one paragraph from the 1975 report.

> Populations of caribou and the movements within the region of our survey have changed little since our first surveys in 1969. The total numbers have fluctuated up and down, which is normal for any area, but their movements have not changed. They still come into and pass through the oil development area without any sign—showing any sign of being too perturbed.

And I'll just drop that and submit the rest of this for the record, but, again this is the longest study, I think, that's been made.

Mr. QUARLES. Any other comments?

Mr. MULLIGAN. John Mulligan, Bureau of Mines. Several transportation corridors are very important to the normal traffic, both early summer and winter, between Nome and villages of Shishmaref and Deering, Serpentine Hot Springs area and the mining area along the Imuruk River. Traffic between Nome and Deering and the mining area along the Imuruk River which includes not only dogsleds and Ski-doos, but heavy track vehicles that haul fuel and supplies for mining and for use in the village. There are also two trails that connect the villages of Shishmaref and Teller. Both routes have a substantial number of travelers during the winter by snowmachine and dogsled. There are alternative routes along the seacoast, but they're much longer and probably more dangerous.

Mr. QUARLES. Yes?

Mr. MOWATT. Tom Mowatt, Bureau of Mines. One brief comment for the record. In terms of acreages and areas of concern, the 600,000 acres so casually alluded to a moment ago. For the record, the area of the State of Rhode Island is 776,960 acres.

Mr. QUARLES. Any other comments?

Mr. ATUK. Richard Atuk, Bering Straits. I'd just like to comment, it is just between Wales and Shishmaref that winter transportation here is very important and as Mr. Mulligan said, from Shishmaref to Brevig, Mission, and Teller. As I stated before that this area was selected primarily for the duck nesting and this occurs other than in the winter and in the summer. Travel is very difficult except by boat, so that we might recommend that as it seems probable that no other use could exist or would exist in that short stretch, that portion just below Shishmaref withdrawal be dropped, which would give the people of Shishmaref and Wales a better feeling because people often tend to be uninformed and are hesitant to travel into even any kind of Government withdrawn land.

I'd also like to state that the people of Nome and Fairbanks have talked about a road from Fairbanks to Nome and that our corporation and those of the village have taken a position against roads connecting Nome and the villages to outside areas to protect their subsistence values. At the same time, we recognize that we are or will be in an energy crunch and that we are concerned about access through (d)(2) areas at sometime in the future, although we would not be willing to have anyone designate those corridors right now. We would like to leave that possibility open.

Mr. QUARLES. Any other comments?

Mr. HUDSON. I might interject a little more geology that seems to be pertinent to some of the energy evaluation problems. The areas 30, 31 and 19, Imuruk Basin, upper Kuzitrin River drainage, and McCarthy's Marsh are structurally bound basins. They are geologically useful. There are active faults along the south side of Imuruk Basin and an active fault along the north side of McCarthy's Marsh. Basically, these basins have been forming since the times the mountains began to be uplifted by movements along these faults. We think that the basins are geologically young, that they are late Cenazoic in age. This information can be attributed as a negative factor in evaluating coal or petroleum potential of the basins. However, it can be construed also a positive factor in evaluating uranium potential. That is, the basins have been there since the mountains have been uplifted. They've been receiving materials from the mountains since that time.

Mr. QUARLES. Any further comments?

SELAWIK

Scenic, Landscape, Historic, and Archeological Values

Mr. MAUER. Fran Mauer, U.S. Fish and Wildlife Service.

I'd like to open with the comment that the Selawik Refuge proposal is one which as I understand every plan and (d)(2) proposal that's been submitted includes. It's one that apparently everyone is attracted to. Much of the Selawik area is low marsh, ponds, wetlands, and interlaced with complex vegetative patterns. The western portion of the refuge boundary is low with very little relief, and flat wetlands very similar to the description that was given of the Yukon Delta area. Surrounding the area are some gradual rolling hills such as the Waring Mountains, Kiana Hills on the north, the Purcell Mountains on the east, the Selawik Hills on the south, the Kotzebue Sound to the west. These uplands are gentle rolling areas. Many of them are thickly covered with lichens and make for relatively easy hiking and traversing. It is a land where timber creeps down the major river drainages from the east and transcends out onto the wetland tundra along these waterways. As you proceed westward, one leaves the timbered areas and proceeds to a pure tundra area. Although it's not a striking scenic wonder such as the large Wrangell mountains, those people that have been in the area can testify to the gentle, pleasant feelings that they get while there. As far as archeological and historic values, the U.S. Fish and Wildlife Service has funded an archeological study in the area. I could submit that to the record—I believe it identified 26 sites. Most of them were involved in fish camps related to the wetland areas, especially where streams drain out of the lake systems in the Selawik Flats. These are real concentration points for migrating whitefish that move up into the lakes and ponds in the summer and then out into the estuarian areas to winter. I have one other comment. The upper Selawik River which is outside of the (d)(2) withdrawal area has been studied by the BOR for wild river qualities. They have found it to be an excellent recreational area and it has high wildlife values in addition. This is in (d)(1) land outside of the (d)(2) area.

Mr. QUARLES. Thank you. Any other comments on scenic/recreational/archeological/historical?

Mr. SHANKS. Yes, Rollin Shanks of the Alaska Coalition. I'd like to second Fran's statements about the kind of uniqueness of the area. Again, it probably doesn't meet the awe inspiring view of Mount McKinley or the Wrangells or something of that sort, but it does have a very unique visual effect coming in through Selawik and up on the lower river as you gradually come up surrounded by this ring of low lying foothills. Again, it's one of these areas that is not for tree lovers. There's very little in the way of vegetation and the vistas are very broad, often 50 to a 100 miles at a time. This could be covered probably better under wildlife as part of the scenery of the Selawik area is the wildlife and there's a large diversity of wildlife, particularly in the lower areas down in the flats, very easily seen from the river. It's a very common occurrence to see flocks of 100, 200 ducks coming off the river, which besides being a resource is also a visual value.

The archeological sites, again, as Fran mentioned, stretch up the river and are very numerous. They stretch clear up into the Purcell Mountains with a historical trade route between the coast and the Koyukuk people. The people of the Koyukuk and the Selawik area often travel back and forth to these areas, trading and following the game.

Mr. QUARLES. Thank you. Before we go on, let me just also say that we are aware of a number of wild and scenic river proposals outside of the areas we're discussing today. One of them, of course, was the Koyuk near the Bering Land Bridge proposal and we'll try to pick those up at the end of the day, in particular the comments on wild rivers or study rivers outside of the proposals that we're discussing. Any other on scenic values? All right, then the next one obviously in this proposal is wildlife values.

Wildlife and Fish Resources and Uses

Mr. MAUER. Fran Mauer, U.S. Fish and Wildlife Service. Again, I'll try to be very brief on this. One of the major features of the eastern Kotzebue Sound system that we're dealing with when we talk about the Selawik Refuge proposal is the mouths of three major rivers convering in a very restricted estuarian system. These three rivers are the Noatak, the Kobuk and Selawik. The nutrients flushed from these rivers mix in with the saline waters of the Kotzebue Sound and make for a very rich and productive biological environment. From the fisheries standpoint, one could possibly call this area the Bristol Bay of the Arctic. It's an extremely rich fishery area. The freshwater wetlands of the Kobuk Delta and the Selawik lowlands are extremely numerous and interspersed, as I said before, with a variety of vegetation that provides for a prime habitat for migratory waterbirds. The production of this habitat amounts to approximately 500,000 ducks, which greater scaup, pintail, and oldsquaw and widgeon are the prime duck species. Numerous nesting geese, cranes, swans, loons and shorebirds also are found in the area.

One note of interest is that the Selawik lowlands is the only recorded nesting sight of the Asiatic whooper swan. The migratory waterbirds traveling through the area exist in the estuarian areas and the large water bodies to the west. Large concentrations of whistling swans can be seen along the outer fringe of the Kobuk Delta and Selawik Lake prior to fall migrations.

During winter, Selawik Lake, Inland Lake, Kobuk Delta, Kobuk Lake, or Hotham Inlet—Kobuk Lake is the local used term for that area—are prime winter habitat for the Kobuk and Selawik River seafish population and also species of whitefish. Here, they're harvested through the ice by Selawik, Noorvik, Kiana, Kotzebue people through the winter. Tremendous quantities of whitefish are found in the freshwater systems, as I said earlier. Yesterday, we heard quite a bit about the arctic caribou herd and how it passes through several of the (d)(2) withdrawals to the north. The wintering habitat which Dr. Lent mentioned yesterday as being a belt that sweeps to the south of those (d)(2) areas mentioned yesterday—the west end of that wintering habitat does lie within the (d)(2) Selawik Refuge area as one of the most heavily used wintering areas of portions of the arctic caribou herd. I believe Carl Gravogel will have some further comments to make on game species in the area.

Mr. QUARLES. Go ahead.

Mr. GRAVOGEL. Carl Gravogel, Fish and Game. I'll again limit my remarks to the major big game species and speak briefly about fur bearers and I'll summarize for the sake of brevity for everyone. There are four big game species that commonly occur. There are moose, grizzly bear, black bear, and caribou. The presentation of Noatak and the Chukchi-Imuruk, I talked about the sparcity of moose prior to 1900's. The same situation exists in the Selawik drainages. However, it's different in one important aspect. Probably Selawik was one of the corridors which the original immigrants crossed and provided access to all of northwestern Alaska. It was either through the Selawik Basin or probably a little bit further south in the eastern Seward Peninsula that moose originally began moving into northwestern Alaska. The population today is both dense and relatively common. However, there are some areas with moose, although I wouldn't say their habitat is the best in the world. There's a lot of climax spruce forest and therefore winter browse in many of the upper drainages is somewhat limited. On the other hand, there are some areas, particularly in the foothills, where moose density is rather high. Aerial surveys, again, reveal a minimum population of 360 moose. I'll briefly go through the drainages. The Buckland has 90, Kuolik, 70, Kauk River, 23, Kugarak, not to be confused with the Kougarok, 20, the Selawik itself, about 42, and the best moose habitat is on the Tagagawik River with a population of about 120.

These surveys are done primarily on the main rivers. We did not include the upper tributaries. The overall population is estimated to be 500 to 600 moose in the area. Most of these are in the foothill regions and, again, like the situation on the Seward Peninsula, there is a fair amount of seasonal movement from the wintering range of the river bottoms up into the foothills and higher tributaries during the spring and summer. Annual productivity is high. Yearlings are 20 percent of the population. Therefore, the population is healthy and reproductively viable. The bull/cow ratios are also high, 60 to 80 bulls per 100 cows. In some areas, 100 bulls per 100 cows. This reflects really the relatively low hunting pressure and the fact that people just don't get into the area much. The individuals that take moose are primarily, obviously, from the closest villages, Buckland, Selawik, and Deering get over there occasionally. Once in a while, you get someone from the southern side of the peninsula, even the Koyuk moving over to the headwaters of the Bucklin. Almost all of the harvest is of subsistence nature. There are a few people from both Nome and Kotzebue who utilize the headwaters of particularly the Tagagawik River and upper Selawik for aircraft. I suspect the harvest, though, is certainly less than 40 moose a year out of the entire area, more likely on the order of 20 and perhaps 5 or 10 are taken by aircraft users. In summary, then, the area contains a good population of moose. Utilization at present is very low. In essence, this is somewhat a refugia. It's a place that people haven't yet gotten to in any great numbers and this is primarily related to the fact that there are no villages immediately close to the area where the moose are. I would anticipate that might increase if more people move into the area.

In the last few years, there's been interest from people outside northwestern Alaska, other residents of Alaska and from the lower 48 in hunting this area. It's a high trophy value. There's a lot of large bullmoose in there in the 60-inch class. Jumping on to caribou not to be repetitive, but this area, particularly around Purcell Mountain and those foothills to the east and west of there, has, for the last 3 years, been one of the largest and densest populations of wintering caribou from the western arctic herd. Our surveys in the spring of 1976 and 1977 indicated there are between 10,000 and 15,000 animals and this area has—perhaps the people talk about the forage values, but some of the largest and densest lichen stands that I've seen. The use for the western arctic herd is primarily from October to April and, again, this would be—they come down from the northern areas on their migration in September, October and they spend 4 or 6 months in the area and return north again. I think I'll let it go at that. We've talked about essentially the biology of the western arctic herd at other times. However, in conjunction with the western arctic herd, there is also a very high density of wolves. Perhaps there is the highest density in the interior or in northwestern Alaska. There was a survey conducted there last spring and I'm not going to give you the numbers. It's incorrect to probably say the number of wolves per square mile. It would suffice to say that there were perhaps 50 to 200 wolves in the area. A lot of wolves concentrate on this wintering population of caribou. There were and still are a number of individuals that hunted with aircraft and, of course, people from the villages of Bucklin, Selawik get up there by snowmachine occasionally. All of these wolves probably would not reside in the area for a year-round basis. I think some of them move to the lower Selawik and back into the drainages of the Kobuk. Perhaps, although we don't know for sure, there might even be some animals that follow the caribou back as far as Noatak. Certainly there is much less dense population of wolves in summer after the caribou move out.

Little is known about the exact populations of grizzly bear. There are some black bear in the area. Grizzly bear—there's little known about the exact population except to say that it's probably abundant and the population density appears to equal or rival that on the Seward Peninsula. As you pass away from there, then roughly 1 bear per 50 to 100 square miles. Some of the biggest grizzly bear that I've measured have come from the upper Selawik. A guy from the village of Selawik itself 2 years ago killed one that squared a little over 11 feet and that's brown bear size for Kodiak. Most of the grizzlys that come out of that country are more like 7 and 8 foot and weigh 300–400 pounds. This one was probably in the neighborhood of 600–800, so there are some big bear in the area, older bear. This one, I think, was in the 20-year-old bracket and, again, this reflects the fact that hunting pressure has been relatively low. There are a few black bear in the area. The utilization is very low and probably most black bear taken are incidental to other hunting activities. They happen to see one when they're boating along the river and they take it primarily for food. The skins are not utilized to any great extent, but they are desired and prized as a food item.

Quickly to furbearers, then. Because of the low lying areas and the number of waterways there, the low lying waterways, there are a high population of associated furbearers, mink, muskrat and beaver. The beaver were not in that area or there were very few beaver in the area 30 years ago. Again, talking with people from the villages and some tertiary aerial surveys, beaver have increased tremendously in these drainages in the last 10 years. Unfortunately, very few people, if any, in these areas harvest beavers. Trapping is sort of a traditional thing and they just don't have any beaver trappers out there that know the technique of taking them. They consider them somewhat of a pest because they block the streams and impede, in their opinion; fist migrations which is true to some extent. A fair number of beavers are shot in the springs with .22's for utilization of hides in home industries, but again, very few trappers, if any, from these villages are taking them. There are a fair concentration of hunting on muskrats. Again, it's a spring activity primarily with .22's. Red Fox are common. Little if any white fox. On occasion, you'll get a straggler coming in from the coast. I would say they're common to abundant in the area and the average good trapper will catch 10 to 20 a season. Lynx are less abundant and they are just perhaps moving into the area and increasing. I would say that you would call them uncommon. Then, finally, wolverine in the area are abundant throughout. The density, of course, because of their character, is relatively low but almost anywhere you go there's wolverine. One trapper last year using an aircraft I know of took 20 wolverine out of the Tagasawik and upper Selawik River alone. That pretty well concludes some of the major wildlife species in the area and I guess can summarize in saying again, it is somewhat of a refugia, in that people in the upper drainages just haven't gotten in there much and it's somewhat of a natural state.

Mr. QUARLES. Yes?

Mr. GORDON. One addition. Along the inlets which are along the easternmost shore of Kotzebue Sound, there is large number of snow geese which concentrate in there in the fall. A very, very important staging area on the west coast of Alaska. I'd also like to ask Carl a question about grizzly and wolverine. How much utilization does each of those species have of the lowland or the flats right at the edges of the lowlands?

Well, for grizzly and for wolverines—how much of that—how important is that habitat immediately adjacent to the wetland area?

Mr. GRAVOGEL. Are you talking about around Selawik Lake itself?

Mr. GORDON. I don't mean in the wetlands. I mean the lowland area right adjacent to it as opposed to the hills and the mountains.

Mr. GRAVOGEL. Well, most of the denning areas for bear is in the foothills region, but it is very common to see bear out in those flats all through the summer, primarily picking berries. They're kind of attracted to the fishery sources. To answer your question, I would say that the density of bears per unit area is higher in the foothills than in the flats, but there are bear down there. And wolverine, particularly in the wintertime—they're asocial animals, as most of you know, and they get them all through the flats there. They move out of the foothills down in the flats for—searching for old fish and food and whatever and so they're rather uniformly distributed throughout all of the lower flats, particularly in winter. And I'll be truthful with you, there's not a lot known about denning—well, not denning, but where the animals go to have their young. I suspect there are sites in the lowlands, but again, probably there's perference for some of the foothills or somewhere drier.

Mr. REFFALT. Bill Reffalt, Fish and Wildlife Service. I just wanted to get into the record an important point which is basically true of all the Interior basin refuge proposals. Nevertheless it is important, I think, to recognize the international and the tremendously national value of some of these areas. The migratory waterfowl in Selawik Basin go essentially to all four lower 48 flyways. Certain species orienting markedly to one, for instance, the whistling swans are generally Pacific Flyway migrators from Selawik. The white-fronted geese and the sandhill cranes go into the Central Flyway or the Intermountain Flyway as far south as Texas.

The lesser scaup from the Selawik to the Mississippi Flyway orientation and the greater scaup, about 85,000 in fall flight, goes to the Atlantic Flyway. In addition to thise nationally important aspects of the resources there, the area supports at least 109 species of migratory birds and we know from banding records that they orient to at least six of the seven continents of the world, so the area, as many of the other ones, is extremely important in the broadest sense of the word.

Mr. REGNART. My name is Ron Regnart. I'm with the Alaska Department of Fish and Game and I'll cover fishery resources only briefly as they were covered somewhat in earlier testimony regarding these species that are present and their abundance. I do want to point out one important point in that the Selawik River is an important sheehish spawning area and for all the Kotzebue area drainage, there are only two known spawning areas for this species. The upper Kobuk River above the village of Kobuk and in the Selawik River. The sheefish is a very highly sought after food fish locally and important for subsistence. Also, there is limited sport fishing in the immediate area and I think a lot of potential for sport fishing. The last good subsistence survey that we conducted in the Selawik area was in the late sixties and that village took up to seven thousand sheefish for subsistence during the late sixties. We are just resuming our comprehensive subsistence surveys in that area this fall and we hope to see how it compares. We don't have an accurate catch figure now. Mention was made about the

Hotham Inlet, Selawik Lake area and it's important as an over wintering area and I can't stress this importance enough. Because of the low water flows in the winter months, we feel the majority if not almost the entire sheefish population over winters in this area during the winter months. Thank you.

Mr. QUARLES. Any other? Yes?

Mr. WICKES. Just briefly, Mr. Chairman. The State's habitat assessment indicates some three-quarters of the Andrus proposal falls in the top two levels in the statewide system for the Selawik Refuge, so it is very productive in terms of habitat.

Mr. QUARLES. Any other comments?

Mr. GREIST. Bert Greist from NANA Regional Corp. Just west of Selawik, there's the village of Selawik, which is my hometown, and there's about 521 people that we use for revenue sharing from the State. And there's about 200 allotments scattered throughout Selawik right on into the refuge. One of them belongs to my parents and we've lived right in the middle of the proposed refuge for the first 10, 15 years of my life and I just—listening to these guys about wildlife, it's pretty abundant. The only reason is that there seems to be, at least on the surface, no hunting pressure—this is practically just due to the cause of inaccessability. It's pretty shallow in some areas towards the east above the headwaters of Selawik. There was a study done that was put together by NANA Regional Corporation around 1972. I more or less took part on this. We went house to house and did a survey on a 3-year average of the amount of wildlife, plants and so forth taken. We almost got ½ million pounds of mammals in that area. We also got 380,000 pounds of fish, mostly sheefish, whitefish, pike, sheefish being the major one. Waterfowl—we had 3,000 pounds. Berries, there's a good variety of berries there. Sixteen thousand berries, that bringing a total of almost a million pounds of foods, plants and animals that we obtained from that area. Also, it's more or less regular to see people from Noorvik, Kiana, Kotzebue, Ambler, Shungnak and every once in a while, we get people from Barrow to Selawik, also. This figure that we use, the take in wildlife, I don't think has changed that substantially. Almost probably 50 percent of this—we'd like to see this continued since it is the mainstay. Almost probably stay there for another 10, 15, 20 years—probably longer if management of renewable resources is prudent.

Mr. QUARLES. Are there any other comments on wildlife?

Mr. SHANKS. Yes, Rollin Shanks, and I've spent, oh, 8 weeks or so living in the village of Selawik and I'd like to just reinforce Bert's comments. I think in the entire 8 weeks I was there, I don't think I was ever served a piece of meat that was outside meat, or very little, anyway, of outside foods, period. Most of those were vegetables and that type of thing which just aren't readily available from the ground, but the people of Selawik are very, very dependent on the surrounding areas and the wildlife and also the uplands for green and berries and that type of thing.

Renewable Resources

Mr. Wickes. Thank you. In terms of agriculture, on the statewide basis, there's no significant potential at all. Forestry, the statewide assessment identifies some two hundred and thirty thousand acres, most of which falls in the 9th and 10th levels of our scale of 10, which would make it very low priority.

Mr. Quarles. Any other comments on Renewable Resources?

Mr. Shively. Mr. Chairman, John Shively of NANA. The comments on this area are similar to the ones that were made for the Bering Sea, the Chukchi-Imuruk with regard to reindeer herding. I believe H.R. 39 also contains in this proposal protection for reindeer herding and we would like the committee to consider that. It is range land. There are some reindeer permits, one of which NANA has, on this land.

Mr. Quarles. John, we had some testimony yesterday concerning the conflict between caribou and reindeer. Does the Regional Corp. share that concern and are you planning to try to avoid those caribou wintering areas or do you feel that that's an issue that you do not share concern about?

Mr. Shively. No, Mr. Chairman, we certainly do share the concern. Right now, we move our reindeer off of the peninsula and over to Deering to winter in order to avoid the caribou problem, but certainly if we do expand in the Selawik area, there is some potential. We are pursuing means to handle that. We've talked with the Fish and Wildlife Service people in Washington and some of the State people. It's clear if you winter reindeer there, we'd probably most likely be fencing in order to keep the reindeer and caribou apart.

Mr. Bevinetto. Caribou catch—take the——

Mr. Shively. Right. They'll come in and mix and if you don't keep the reindeer apart, the reindeer will run right off. It helps Mr. Gravogel get more caribou in his caribou herd. [General laughter.]

Mr. Quarles. Let's move to the land selection questions. Jim, do you want to address that again?

State and Native Land Selections

Mr. Wickes. OK, within the Andrus Selawik area, there is no State land at present. The State has identified some lands along the coast of the refuge as relatively low priority State selection interest areas, reference number 63. It would be interested in perhaps obtaining certain lands which were not conveyed to the Native corporations. Our estimates of final Native holdings within the Andrus Selawik proposal come out at slightly less than 900,000 acres, which would comprise some 26 percent of the Andrus proposal.

Mr. QUARLES. Can we assume that those are—right now, the Native selections holdings—the selections are very high in that area. Can we assume that most of those selections are around Selawik Lake? Is that where you're looking or——

Mr. WICKES. I believe they're—someone can correct me on this. I believe there are three villages which fall, at least in part, within the refuge and right now, according to information given to us by BLM, all land withdrawn for selection purposes has been selected, so there will be considerable cut-back eventually. I'm not sure exactly.

Mr. QUARLES. Yes?

Mr. GREIST. Bert Greist from NANA Regional Corp. Most of the selections within the proposed Selawik Wildlife Refuge are Native allotments and historical cemetery sites. We have about 200 to 250 historical cemetery and historical sites there and the balance of that, approximately 200 Native allotments. Each allotment aggragates approximately 100 and 60 acres.

Mr. QUARLES. Any other comments?

Mr. WILLIAMS. Dave Williams, Doyon. We do have holdings that get in very close to this—there in the Purcell Mountains. I'd like to cover those when we do the Koyukuk.

Mr. QUARLES. Fine. Any more comments? Okay, then we can move on to Energy. I recognize that you covered Selawik at least in part last time, but if you have any additional comments, now is the time.

Energy Resources

Mr. WILSON. This is Tom Wilson, AOGA. I have pretty well covered, I believe, in earlier discussion the Selawik Basin and Kotzebue Sound. I think it would be appropriate to point out that it is an important area for possible OCS development of this area and the onshore portion of the Selawik Basin—very little is known about it. It's a fairly good sized sedimentary basin and mostly covered with sufficient alluvial deposits.

Mr. QUARLES. If that were an OCS area, I assume the staging would be out of Kotzebue?

Mr. WILSON. This would be a reasonable assumption.

Mr. QUARLES. Any other comments on Energy Resources? Yes?

Mr. GRYBECK. Donald Grybeck, U.S. Geological Survey. I don't know whether this should be addressed here or in the next section, but the mineral potential of the area is primarily uranium. Again, looking at the map we have put on the record already, there—the Purcell Mountains to the Zane Hills, there are a number of Cretaceous monzonitic syenitic granites. There's quite a bit of work on these things. As I look at the proposal, I think not many of the granites actually impose on the Selawik Refuge proposal, but they may a small amount. These areas are very active. They do have a uranium potential. The—most of the area is mapped in probably satisfactory surface mapping and it is all covered by soil and gravel and this sort of thing. There's no outcropping out in the basin. If I was to look for sedimentary uranium deposits, that would be a very good place to look out in that basin. There's no real indication that such does occur out there. There are outcrops of Tertiary sediments just north of the Selawik Hills that would be a likely [indiscernible], but I'd say again there is no evidence that they're really out there.

Mr. QUARLES. Yes, go ahead.

Mr. HOFFMAN. Barry Hoffman, Alaska Miners. I'd like to make a couple points on uranium. In this area as in all the other areas I've talked about I've had personal experience here, actually been on the grounds and done fieldwork anywhere from, oh, 2 to 3 weeks up to 3 or 4 months in these areas, sometimes over 4 or 5 years. I'd like to say that although the Tertiary sediments—potential Tertiary basin there, there's no drilling, nothing is known about it, but it does have a potential if you can say that the basin is there and it is probably very high. The intrusives that border the area are quite uraniferous. This has been identified as a uraniferous province by several government agencies and my own personal feeling is that the southern portion of the potential basin would be the most likely area and I think we can get away with quite a few of the wildlife conflicts just by looking toward the southern portion of it.

Mr. QUARLES. What do you mean? Outside of the area or——

Mr. HOFFMAN. No, just the southern fringes. Some of it would be outside of the proposal, some inside—very near the boundaries.

Mr. QUARLES. Yes. Thank you. Any other comments?

Mr. JANSONS. Uldis Jansons with the Bureau of Mines—the Department of Energy has undertaken a regional uranium exploration program in the Seward Peninsula area and this includes regional geochem work including the Selawik withdrawal area. The results of that are not available at this time.

Mr. QUARLES. Any other comments on Energy Resources? All right, then if we could move on to nonfuel minerals.

Nonfuel Mineral Resources

Mr. JANSONS. Uldis Jansons, Bureau of Mines. I'd like to put it in the record at this time that the Bureau of Mines has a joint program with the Department of Energy and the Los Alamos Scientific Labs to analyze the same samples that were collected for uranium. We're having them analyzed for a whole series of elements to see what other commodities may exist in this area.

Mr. QUARLES. Any other comments on the nonfuel minerals? OK, then if we could go to transportation and access.

Transportation and Access

Mr. QUARLES. Any comments at all on this? [Pause.] Excellent.

Mr. HOFFMAN. Barry Hoffman, Alaska Miners. I would like to point out that one of the potential access routes from the Ambler district is either to the coast somewhere near Kotzebue or down to the Seward Peninsula. I think the Seward Peninsula is the most favored and it could conceivably pass through the boundary and I think some possibilities should be made for this.

Mr. QUARLES. Any other comments?

Mr. MAUER. Fran Mauer, Fish and Wildlife Service. As many people have mentioned, the transportation corridors have been proposed that would split off heading toward the Seward Peninsula and pass through or nearby the proposed refuge area. Some of the upland habitats which have been discussed earlier, including the very rich lichen mass, appear to be laying over the top of stable responsible for stabilizing many sand dunes in the area. Some of these sand dunes are related to the Kobuk sand dunes. Disturbance of this area in addition to impacts of the caribou migration and wintering could also be incurred as a result of wind erosion in these sand areas. In other words, what I'm saying is lichen covered sand dunes are very sensitive areas from many standpoints.

Mr. QUARLES. Any other comments?

Mr. GREIST. I just wanted to put on record I believe that the proposed access corridor from the mining district to the Nome area is vehemently opposed by the villages in the region.

KOYUKUK

Scenic, Landscape, Historic, and Archeological Values

Mr. MAUER. Fran Mauer, U.S. Fish and Wildlife Service. The Koyukuk Refuge area is another of several Interior solar basin areas. I think enough has probably been said generally speaking about these areas in previous testimony. I believe that considerable comments have been made on these Interior solar basin areas in previous testimony and I'll just say that generally speaking, those comments that have been made on other areas such as the Yukon Flats would also apply, generally speaking, to this Koyukuk area. It's a low lying sedimentary basin with many lakes, ponds, streams, smooth marches, surrounded by low lying hills, some of which are sparsely forested. One other comment on the scenery involved here is that in this area, we do have a 10,000 acre sand dune called the Nogahabara sand dunes, which is of ecological and scientific interest. Again, let me reiterate the other recreational values and scenic values of this area that are transported a long ways away in the form of migratory birds and bird migrations that are enjoyed by millions of people throughout the lower 48 States and several other countries.

Mr. QUARLES. Yes, Rich?

Mr. GORDON. Ok, this may be a good place to summarize some of the types of visual related values as people have emphasized. Part of the visual is the fact of seeing, hearing and being aware around you of all of the birdlife, the waterbird life and the evidence of the furbearers and other animals. This is a very active place in terms of seeing and hearing and being aware of the signs of a variety of birds and mammals. The comments I'm going to make apply to all wetlands in Interior and west coast of Alaska. They're just a number of categories of visual types. The marginal fall lake terraces I talked about in relation to Yukon Flats. This is benches that are raised above the river bottomland level, but tend to be rolling. They include large numbers of fall lakes and are somewhat analagous, although a different formation, to the Marino lake deposits along the more glaciated areas. Presently there are places where a number of major rivers join together. You simply have an enormous maze of sloughs and backwaters. Perhaps a classic example of that is the junction of the Porcupine and the Yukon flats proposal and in that particular area, you have the Black and the Sheejek and various other rivers which all come together in about the same plain.

The third type of destinctive landscape, is a maze of small streams—tiny, little streams going through a vast marshy plain. Perhaps the classic example of that is the lower portion of the Sheejek River on the Yukon Flats proposal. The fourth type is the classic river meander pattern. I've already referred to this in relation to the Kobuk Valley Park proposal. On a larger scale, perhaps the classic example of this in Alaska is the Three Day Slough area of the Kobuk River. This is in the Koyukuk River in the Koyukuk proposal. This is in the uppermost bend of the Koyukuk near Huslia where we have on a larger scale the same oxbow meandering through backwater type of features that I've already described with the Kobuk Valley. Here, the whole thing is just a larger scale. The 5th is a network of ponds. This can involve a network of interconnected ponds in the Kayu Slough being an example, parts of the Yukon Flats, where we have that type of lay-out. You have a good opportunity for recreation and canoe networks can be developed and this is a very attractive type of landscape for travel. This also can simply include vast numbers of ponds which are separate from one another—very tiny ponds. The best example I know of of that type of landscape is in the Imoko. You have thousands of these little tiny ponds per square mile, frankly. Finally, the—at the mouths of some of these rivers, we have a large number of very shallow, sometimes very wide, distributaries where the rivers flow out and spread out over the gultaic plain.

Perhaps a classic example of that in the State is the outer—the outer delta of the Yukon River itself. But let me just point out that these are all very nice theoretically and they're very distinct when you view them, but as Chuck Evans and other people have said, you generally don't experience these things by looking at them. You experience them by travelling through them or, again, it's much more the idea of a sense of place, a sense of movement, a sense of what's immediately around you than simply a theoretical sense of different types of landscape. Thank you.

Mr. QUARLES. Any other comments on scenic values? OK, let's go on to the wildlife values.

Wildlife and Fish Resources and Uses

Mr. MAUER. I'll try to summarize these quite briefly if I may. Again, as has been mentioned earlier in other Interior waterfowl lowland basins, the Koyukuk is a very outstanding waterfowl production area. Its fall flight average is approximately 800,000 ducks and a hundred thousand migrate to all of the major continental flyways. Shorebirds and other [indiscernible] are migrants from several of the continents. Of the estimated 5,000 trumpeter swans in Alaska, approximately 330 are found within the Koyukuk area. This represents the northernmost limit for the species. Local residents in the area and our Fish and Wildlife swan surveys indicate that this population is thriving and increasing and expanding. In addition, the Koyukuk is one of the most famous furbearer areas in all of Alaska. It produces a great number of muskrat, beaver, otter, in addition to such species as lynx and wolf. One comment I'd like to add at this point, I personally was involved in doing some surveys on the Huslia River which flows through this area and in the course of 70 miles traversed on this river, I encountered over 80 broods of white-fronted geese. Many of these rivers that flow in this area are extremely important rearing areas for white-fronted geese. The Koyukuk area is one which has been burned very extensively. It's one of the more heavily burned areas in the Interior of Alaska. It very interestingly, it currently supports one of the more healthy and thriving moose populations, also. Again, as had been mentioned before, the Arctic caribou herd, which moves through several of the (d)(2) areas that we spoke about yesterday, does come down into the Koyukuk area and winters in some years quite extensively in the area, villages such as Hughes, Alkakit, and Huslia. Those people do harvest caribou from that herd when it's in those areas. Black bear, grizzly bear—it's a very important black bear area. They're very common throughout this lowland area. Grizzly bears are not quite as common. They're found in generally the upland areas. I believe that's about all I have at this time. Thank you.

Mr. QUARLES. Any other comments on wildlife? Yes?

Mr. BURRIS. Oliver Burris, Alaska Department of Fish and Game. I can only add a little more to what Mr. Mauer has come up with, but a pattern in the last few years—utilization of the various wildlife species has shifted somewhat. And within the area, I think we're presently seeing about utilization of both moose and caribou. It is correct, it is one of the areas where we have a moderately to moderate moose population in the Interior. The aggregation of soils along the Koyukuk River and many other streams, of course, creates the annual habitat willow which results in a high concentration of moose in these wintering areas along the major drainages and along some of the minor drainages. The lowland areas which are also important for waterfowl are equally important to moose in the summertime for calving areas and for early summer and wintering areas. The importance to caribou and moose in certain times of the year of the same habitat are expressed many times, but from this time of year, February through April, we commonly find moose and caribou utilizing the same habitat in many areas such as the koyukuk and they primarily are concentrating on the aquatic vegetation along the lakes, the same vegetation which supports the waterfowl, of course, in the summertime.

This is important to muskrat and the whole food chain, which, of course, is the reason for the high furbearer populations and the high utilization of furbearers in this entire area. The beaver and the furbearer resource in general is quite good in this area. I went through and marked off what I thought was good and I couldn't find any of the furbearer species that fell substantially out of the good habitat and the good population, recognizing that furbearer populations are subject to very large fluctuations depending upon the cyclic nature of things such as snowshoe hare and what-have-you. The beaver have been for some time utilized very heavily in this area and may be at or near maximum in any one given year, depending upon market prices and other types of employment that are available to the people. The access into the area, of course, in the wintertime for trappers is primarily by aircraft and snowmachine and generally it does not conflict with many of the other values such as wintering caribou or wintering moose populations. The human use on all big game species right now in the area is high, as I mentioned earlier. This is getting into one of the areas where you find that black bear becomes a very important animal for local use. Black bear are distributed well throughout the Interior of Alaska. We don't find much interest coming on black bear as far as non-local use is concerned, but in the Interior, we find that black bear are much more important to local people and there is some conflicts at times between the black bear populations and the fisheries, particularly for those people that are trying to harvest the fishery resource at the time. Anyway, black bear are commonly taken and utilized for food.

In this area, it's already been brought out that the caribou move in and out of it and what happens in there is going to potentially affect the distribution of caribou wintered in the use of the area. We commonly overlook the fact that moose move throughout the interior of Alaska. If it were in the lower 48 it would commonly be considered a migratory species. In those areas where we have studied those, we commonly find that they move forty to fifty miles easily from summer range to fall or wintering. In many cases, on an annual basis, they move even farther than that. The concentrations of moose that we find along the Koyukuk River in this area obviously is the result of the moose population throughout the general area and as Mr. Mauer pointed out, the prior history of the area—frequent burning over many years, probably has led to this generally moderate to large moose population. In Koyukuk and areas within the Koyukuk area are very key littering areas. Unfortunately, we cannot identify the population identities of where these animals are moving. It's unquestionable that this area is also important for animals that reside for a good portion of the year outside of the area and litter within the area. This is moose, again.

Because we have concentrations of wintering caribou and moose in the area, we also find that from time to time we have a very high population of preditors, primarily wolves. This area has sustained an exceedingly high annual harvest of wolves for at least twenty years in this particular area and it probably will continue for as long as we maintain good ungulate populations in the area at the same time. The present use of the wildlife resource does not result in any extensive transportation conflicts at this time. There is a developing conflict within the area between local use in the summertime, primarily for the moose resource, and use coming from outside of the few villages that are located within this area.

Mr. WILLIAMS. Excuse me, when you say local use, are you speaking of subsistence use?

Mr. BURRIS. Local domestic use.

Mr. QUARLES. Is there much professional guiding or recreational hunting in the area at all, either professional guided or personal?

Mr. BURRIS. There is a considerable amount now and that amount has increased considerably over the last 4 or 5 years and probably will increase. The whole Interior—there's a rather interesting conflict, sometimes the total amount of use, both—primarily for recreational purposes and for meat use, often times does not increase dramatically from one year to the other. You find as populations become troubled in one area, then the areas that have good moose populations then receive a higher percentage of the use over broad areas of Alaska.

The point that I was trying to make was that—I guess paraphrased from NANA that that eighty percent, twenty percent dependence upon marine and terrestrial wildlife resources in the area was a very temporal thing and could change with conditions. Likewise, the dependency of the Interior residents on the moose in the Koyukuk area also depends on the relative abundance of moose in many other areas and the tendency is that if the area that you live in has a low moose population, you go to the area that has the moose populations in order to harvest it. This makes it exceedingly difficult to manage these areas as single units when you're talking about wildlife resources. Therefore, when you do have shifts of this type, conflicts do develop. They develop between user groups and they develop between people using different types of transportation and oftentimes, there's no single way to identify one of these groups. Our interest, from a research management standpoint in this area is important to us. We have used this area since the late fifties, early sixties to monitor the general welfare of moose in the middle area of the Yukon drainages and we run periodic surveys in this area which gives us a crude idea of the population levels and the welfare of the moose population. Most of our activity is aircraft supported and I think even the research that we would extend in the future would also necessitate the use of aircraft in the area in order to maintain our factual base of information. That's all I have, thank you.

Mr. QUARLES. Thank you. Anything else on wildlife? Yes?

Mr. REGNART. Yes, Mr. Chairman, my name is Ron Regnart. I'm with the Alaska Department of Fish and Game and I have some remarks on fishery resources. I would like to ask if I could do the Kanuti at the same time. That would clear me out of here.

Mr. QUARLES. Certainly, go ahead.

Mr. REGNART. The Koyukuk Refuge area—there is a large salmon run that migrates through the Koyukuk River to the upstream spawning areas, but again, there is some salmon spawning within the refuge boundaries. We have peak count surveys on the Dakli and (indiscernible) totaling 13,000 chums and on the Gisasa River, up to 400 Kings, nearly 60,000 spawning chums. I'd like to point out that we discovered the Dakle River Klery Creek salmon population just back in 1975 and I think this exemplifies the vast amount of drainage that the Yukon Interior Alaska covers and that we still are doing basic inventory work in many parts of the drainages to find out the presence or absence of important species. The subsistence salmon catch in the village of Huslia, which is in the center of the proposed area, we have documented up to a hundred King salmon and 16,000 chum salmon during a single year. The catches average closer, however, to 5,000 salmon of all species for the village of Huslia.

Turning briefly to the Kanuti Refuge area, the south fork of the Koyukuk River, especially the lower part of the stream, is a major chum salmon spawning area. We've documented up to 15,000 spawning salmon, 150 Kings. I believe the north end of the refuge is in the lower end of the spawning area. In addition, Henshaw Creek has a King salmon spawning population right around 150 and a small chum population that goes to the Jim River, which is just north of the refuge area. The subsistence harvest for the villages of Alatna and Allakaket, just outside the boundary, averages about two hundred Kings and eight thousand chum salmon a year. Also, they make substantial sheefish catches all up and down the Koyukuk. At present, the types of management research activities that we have going here is just simply low level aircraft surveys to document the number of spawning areas. We do feel we have potential need to perform both boat surveys and aircraft access in the area, especially when we do tag recovery projects downriver, we must have access to recover tags from the spawned out carcasses. That concludes my testimony, thank you.

Mr. QUARLES. Thank you. Any other on wildlife? Yes?

Mr. MAUER. I wanted to add some comments on the aspects of fire as related to caribous and moose. This theme seemed to be coming out in testimony just before we broke for lunch. What I want to say or need to say is that while fire in the winter range of caribou is generally viewed as harmful to caribou winter range, there are indications that in the long-term ecosystem management, these fires are actually beneficial to the growth of lichen beds in certain areas. Although fire would destroy the lichen beds, it may be necessary and research has shown that many of the very excellent lichen beds we have in Alaska today have a fire history which possibly prepared the subarctic for a lichen invasion of the area. That's the main point I wanted to make on that. It's not a simplistic thing where we say all fire is bad for caribou, especially when we're talking about long-term stability of the caribou winter range.

Mr. QUARLES. Thank you. Does anyone else wish to speak to wildlife? In that case, the next topic is renewable resources. I see the State is not here to give us the figures. Does anyone else wish to speak to renewable resources? Then land selection. Does anyone wish to speak to land selection? Yes?

State and Native Land Selections

Mr. WILLIAMS. Dave Williams, Doyan, Ltd. I'll leave the acreage figures to the State. Maybe they'll show up. I'd like to, if I could, take the Koyukuk as kind of an example. It's become a microcosm of all the problems as we explore this under the (d)(2). First, you'll notice that we have a village lying in the middle of the proposed refuge. As proposed at this point in time, we will be checkerboarded with these conservation lands. We have no objection to having the Bureau of Fish and Wildlife as neighbors. We do have a concern getting back and forth to our checkerboards and the access back and forth on this. Just briefly, this same type of problem appears at least in the following areas: Yukon Flats, Kiyu, Kanuti, and the Koyukuk. Not always is a village surrounded, but there are significant tendencies for this. To the north of the refuge, and actually the refuge boundary takes in some of our selections—we have what we call the Purcell Mountains, Zane Hills block. This again is an example of a proposal isolating us from the river bottoms. As I discussed earlier, it happens also on the Kandik and the flats areas by virtue of the Yukon Charley and Yukon Flats National Wildlife Refuge and the Forty Mile and the present Gates of the Arctic proposal and to some extent in the Nowitna, the rampart portion of the Yukon, McKinley Park and the Innoko. These, of course, could lead to one problem that we foresee and that is access across the conservation lands to our lands and I think I've said plenty about that today or over the last week.

Also, accessibility, that is, the development of our lands and offset impacts of our development into these conservation systems. Other things that we see are needs for cooperative management in these aras and I want to get our desire for such a thing on the record, the need for exchange provisions in such areas, and in management problems beyond the access thing, I think there's been a lot of talk about fire control. Our position would be at this point in time until we're certain that we don't have an economic forestry resource, we are going to want to be protected. Now, I know this is directly in conflict with probably good wildlife management, but until we can count those trees and see if those trees are a valuable resource, we are going to want protection and under the ANCSA, we've been guaranteed protection. I think protection of our lands will go beyond that if some of the agencies start using wildfires as a management tool. They're going to have to be cognizant of the fact that there are these in-holdings in areas where we don't want our trees burned. And I think anybody who's been around wildfire can see that we're going to have some more problems. My rule of thumb is anytime a fire is over a hundred acres, it's out of control.

In the Purcell Mountains, Zane Hills area—I'm not going to get too deeply into it—we've got four hardrock mineral prospects, lead, gold, copper, molly, plus we have numerous radioactive materials prospects. And, again, I want to say when I talk about a prospect, these are things where we are prepard to put money into drilling problems. There's a chance that someday there may be a mine in the Purcell Mountains, Zane Hills area. This causes me concern because as Fran mentioned earlier, we may be on a caribou migration route. I'm not saying that we couldn't develop our mines because of caribou. I'm not saying that we might not make the choice not to develop mines because of caribou. But I think that we do need to get together and to look at these things and cooperate in the management of these areas to be certain that any impacts that might be forthcoming from our development of programs will be minimized. And I think that that will be the Native plans.

Mr. Quarles. Thank you. Yes?

Mr. REFFALT. Bill Reffalt of the Fish and Wildlife Service. I just wanted to make a very brief mention that I don't think any of the several agencies would contemplate using wildfire as it's normally defined as a tool. If the Fish and Wildlife Service or some of the other agencies intends to use fire as a management tool for improving the wildlife habitat or whatever, it would be controlled fire. Any agency that might be involved, be it BLM, Fish and Wildlife, or National Park Service, would have for any area a management plan for fire that would carefully specify safety for villages or village resources or regional resources and fire used as a tool would not be wildfire. It would be controlled fire.

Mr. QUARLES. Any other comments? We'll go on to energy values.

Energy Resources

Mr. WILSON. My name is Tom Wilson, representing the Alaska Oil and Gas Association. I'll address my remarks to the area of the Koyukuk basin. The proposed Koyukuk Wildlife Refuge in the alluviated area just east and north of [indiscernible] in the Kanuti Wildlife area are located within the Yukon-Koyukuk sedimentary basin as defined by geologic maps published by the USGS and others. In the USGS open file report 410, trillium possibilities of Yukon could—the problems by W. W. Patton in 1970. This basin was indicated in testimony a week ago Monday relating to the Yukon-Kuskokim Delta region by Mr. Morgridge as a large province, with predominantly Cretaceous sediments covering more than fifty thousand square miles in Western Alaska. Much is unknown about the geology of the area. However, it has been determined that it contains a thick sedimentary section comprised or more than twenty thousand feet of nonmarine and marine upland and lowland Cretaceous sandstones and shales and numerous large complex structures that could provide objectives for oil and gas exploration.

Prospects for younger Tertiary sediments beneath the broad alluvial covered lowland areas within the province, such as Koyukuk Flats and Kanuti, or—I'll back up. I guess I've been trying to make a point that there are maybe Tertiary sediments beneath the broad alluvial areas and, of course, beneath the Cretaceous and the pre-Cretaceous section, there could be buried strata of other ages. That's really undetermined at this time. The only exploratory well in the basin was drilled near Nulato in 1960. It went to a total depth of 12,015 feet in Cretaceous sediments and was abandoned without finding any significant indications of oil or gas. This well was located in Section 7 at Township 10 South, Range 2 East, of the Kateel River Meridian. The more accessible broad lowland areas in the province are the Kanuti Yukon Koyukuk Flats and the Innoko valleys, but because of the cover of alluvial deposits, it's really not known about the prospects of the possible bearing Tertiary. Transportation corridors for exploration and development of oil and gas resources in the province are another matter of concern. Such corridors would reasonably be expected to utilize the lowland areas and follow some of the main river valleys across the region. They certainly would be needed if anything developed in the area.

Mr. QUARLES. Anyone else on Energy Values? Yes?

Mr. GRYBECK. Yes, Donald Grybeck, U.S. Geological Survey. There is some potential for uranium deposits in, I guess, about the top eighth of that area. It's again this trend of granitic rocks, the Cretaceous rocks that have disseminated and vein-type uranium deposits. The cover is pretty dense in there. I don't know that you can see much of it. I don't think much work has been done within this area. Particular pieces of land have been selected on that basis. We do have geologic coverage over most of this area. There's geologic mapping. There's no good resource summary of it. It's about 10 years old, most of it. Relatively little work by the industry in the area. If I might, I'd like to go on to minerals as a continuation of this.

Mr. QUARLES. Why don't you wait just a minute because we haven't finished energy.

Mr. GRYBECK. OK.

Mr. QUARLES. Go ahead.

Mr. HOFFMAN. Barry Hoffman, Alaska Miners. I'd also like to point out some uranium potential in both the Tertiary and Cretaceous sediments in the basin, although this probably is quite a bit lower than some of the other areas we've talked about. Also, in the eastern portion of the largest withdrawal on the map up there, there are some young rhyolites and interbedded sediments and there has been some industry activity in this area and there will continue to be industry activity for uranium and similar uranium occurrences in rocks of this type are known in the world and they are potentially significant for uranium. I'd also like to mention the possibility of coal for local use in both the Tertiary and Cretaceous rocks and I do emphasize local, but it could be a significant source for the villages in the area.

Mr. QUARLES. Yes?

Mr. WILLIAMS. Dave Williams, Doyon. Yes, there has been quite a bit of exploration for uranium in this area. We did it. There is some there. We do have drillable prospects. It's not public and I can't say much more than that.

Mr. QUARLES. Yes?

Mr. SILVER. A question. Barry, do you agree with GS that the top 1/8 of the withdrawal——

Mr. HOFFMAN. Well, on the intrusive rocks, I would say that that's the best possibility for that, but as far as the sediments go and then these rhyolites they talked about, they're covering the rest of this large basin.

Mr. QUARLES. Anyone else on energy resources? Then we can go ahead with non-fuel minerals.

Nonfuel Mineral Resources

Mr. GRYBECK. In the southeast, about a third of that area we're talking about, there is potential for various base metals and uranium. There are a few mineral occurrences and geochemical anomolies. Again, I think there's relatively little work done. [Indiscernible] the record uses the term permissive quite frequently in this area as permissive for copper and uranium deposits. In other words, this is an area that has really favorable geology, but little is known.

Mr. QUARLES. Any others?

Mr. MULLIGAN. John Mulligan, Bureau of Mines. The enlarged version of the Koyukuk tends to impinge on the north on the area that is very favorable for minerals. Just the upper—the northern part, in addition to the areas mentioned.

Mr. SILVER. Does the Andrus proposal eliminate much of this?

Mr. MULLIGAN. I believe it does, but I don't know.

Mr. HOFFMAN. I'm having some trouble locating the Andrus proposal on the maps. If you could point it out up there on the map——

Mr. QUARLES. I think it's the red line.

Mr. MULLIGAN. We will submit a map showing the Andrus proposal as part of testimony. We don't have it here at the present time.

Mr. SILVER. OK.

Mr. QUARLES. Any others? Yes?

Mr. SMITH. I'm Dave Hederly Smith with the Alaska Miners Association. I think the state of the land in here that is (d)(2) that—generally speaking, I think the Lord was thinking more of the moose than he was of the miner when he created this. It's not [indiscernible due to laughing].

Mr. QUARLES. Anyone else?

Mr. WICKES. Just for the record, the State's assessment has identified some 680,000 acres within the Andrus proposal of 4.7 million acres with some mineral potential, so it's relative to other proposals we considered here, it's relatively small in terms of hardrock potential. Only 60,000 acres would fall in the top 20 percent.

Mr. QUARLES. While we're at it, could you go ahead and comment on renewable resources and land selection so we can complete the record?

Renewable Resources

Mr. WICKES. In terms of agriculture, again, pertaining to the Andrus lines, we've identified some 400,000 acres having some agricultural potential out of which ranks in the bottom half of the statewide scale. In terms of forestry—some 50 percent of the area has some forestry potential, again all falling in the bottom half of the statewide scale. In terms of State land, there are roughly two townships that are within that area near the Huslia village. There are no State selection interest areas within this Andrus proposal and we estimate final Native lands within those boundaries to be approximately 490,000 acres.

Mr. QUARLES. Could you tell us for the record what the purpose of the State selection is there?

Mr. WICKES. They were primarily selected because of access to the Koyukuk River.

Mr. QUARLES. All right. Does anyone have anything else to say? OK, does anyone have anything to say about transportation or access? In which case, we'll turn to the Kanuti.

KANUTI

Scenic, Landscape, Historic, and Archeological Values

Mr. QUARLES. The first area on the Kanuti are the landscape, scenic, and historical archeological values. We'll start off with the Fish and Wildlife Service.

Mr. MAUER. The Kanuti area, again, is solar basin and therefore has a great deal of similarity to the several other solar basins that you've had described to you abundantly. The southern portion of the Kanuti area has now rolling hills and a rather attractive landscape. Most of it lies, I believe, outside the Andrus proposal boundaries and may be included in part in some of the other boundaries. This is another one of those areas that has a pleasing, gentle appearance, land that is accessible to people in an area where people can walk and enjoy the area. As you go northward into the flat basin and the ponds and lakes, the river channels, and northward of the proposal, you do get to an area where on good days you can see the Brooks rising to the north. It is a good location to look at the mountains, I think I'll leave most of the scenic grandeur to those folks who have a penchant for describing it. [General laughter.]

Mr. QUARLES. Rich, I think he means you.

Mr. GORDON. I just want to call attention to one feature which is unique to this area and so far as the geologic community knows it's unique for the State of Alaska. In the southeastern portion of the Metcalf-Udall proposal that's outside of the Andrus proposal are two lakes which occupy a topographic position which differs from any other area in the entire State of Alaska. One of these lakes has a beautiful name—Sythelymankat Lake—is round, large. It is 1,500 feet deep, probably the deepest lake in the interior of Alaska, and that particular lake is believed to have been caused by a impact from a very large meteor. There is no other known formation of this kind in Alaska and so far as I know, there's no other known formation of this kind which is filled by water in the lower 48 States, either, so it has extremely high geological significance. In addition to that, the lake immediately next to it is of the same form and shape, although to the best of my knowledge, the origin of that lake is unknown. Beyond the geological significance, these lakes are very scenic. They lie in a basin surrounded by 3,500 foot rolling mountains. They're very pleasing for this sort of a landscape. These are mountain lakes. They add a great deal of diversity to this proposal and as I say, this is the only proposal in the interior that has such a landscape. In fact, in a nonglaciated part of the State, there's nothing else quite like it. I want to point out here, the Andrus proposal does not include this area and I think the major reason is just simply acreage. This ridge and the lakes include a very small acreage beyond the Andrus boundary, but it completes a watershed. I can't emphasize too much the—when you have watersheds that are fairly small, it does not make sense to draw the line about a township or two townships below the crest of the watershed.

We've seen an example of this in the Hosannah Highlands in the northwestern portion of the Yukon Flats. Well, we haven't talked about the example, but in the southeastern boundary of the Koyukuk is another example of this where the watershed falls about one township below the crest of the ridge. I just want to emphasize the importance of following watershed lines. It just doesn't make sense to slice off the top 5 or 10 miles of a watershed.

Mr. SILVER. Can you land a floatplane on the lake?

Mr. GORDON. I'm sure you can.

Mr. SILVER. Is it in Native selection?

Mr. GORDON. Yes, it is.

Mr. WILLIAMS. Dave Williams of Doyon. No, it's in regional deficiency selection. It's a beautiful lake, it really is. I have to agree with Rich. After you get over the flats, it's all grass lakes. It's dyked with decomposed gravels and granites on sand beaches of the lake. There seems to be hot springs in the area because part of the lake stays open in the winter. It's big, it's fun to go in, there's a cabin up there on the east end of the lake. On the west end of the lake, there is an area of extreme importance to the people of Allakaket. It's a shaman's grave. I wouldn't want to advertise it, but it's one of the few areas of the Interior Alaska where you can actually go arrowhead hunting and find surface finds, very beautiful obsidian knives and points, that relate back to Indian Mountain which is just to the west of the area. We have a deficiency selection and also a cemetery and historical site selection there.

Mr. QUARLES. Presumably, even if you should not make your deficiency site selection, you would make that western portion under your cemetery and historical site selection?

Mr. WILLIAMS. I think we would almost take the whole lake, just because of the significance to the people. I mean, if you've been there and you've been on the flats, there's such a drastic change. You can see how the lake could have a religious significance to the people. I think we would keep the whole thing.

Mr. QUARLES. Anything more?

Mr. GRYBECK. OK, just for the record, there's some doubt whether that is a major impact—the last thing I want to do is get in the middle of that argument.

Mr. QUARLES. Go ahead.

Mr. HOFFMAN. Yes, Barry Hoffman, Alaska Miners. I'd also like to enter that into the record that it would be a shame to withdraw that meteorite impact crater because it's very speculative. Very, very speculative.

Mr. QUARLES. That would be another area to stop and check out——

Mr. SMITH. Even if we are interested in the potential nickel resource. [General laughter.]

Mr. WILLIAMS. As long as we're on this digression, interestingly enough, the soil geochem up there is showing anomolies for nickel.

Mr. SMITH. Chromium, also.

Mr. WILLIAMS. So, I don't know, it's kind of a neat place. You ought to go there. I'm certain that that's an area that we should look at cooperative management on.

Mr. Quarles. Any other comments on scenic/historical/wildlife—excuse me, historical/archeological? Then let's do proceed to Wildlife. We'll start again with Fish and Wildlife.

Wildlife and Fish Resources and Uses

Mr. Swenson. Thank you. Lou Swenson, Fish and Wildlife Service. The proposed Kanuti Refuge lies within the Kanuti River basin which flows into the middle Koyukuk drainage. This superior basin is characterized by lakes and marshes and foothills throughout the broad rolling plain of the Kanuti Valley. This habitat produces significant population of migratory water birds which travel to many points of the continent and Mexico. Nesting populations of ducks average about 34,000 or over 30 per square mile. Primary species include scaup, widgeon, pintail and scoter. In the spring, this area supports over 46,000 Canada and white-fronted geese, the latter nesting in greater density numbers than most other waterfowl areas of the State. In total, the area contributes at least 75,000 waterfowl to the fall migration. In addition to waterfowl, a species of marsh and water birds including loons, grebes, sandhill cranes nest on the Kanuti. Ten species of shore birds also nest here and another 10 species are found during migration periods—other migration periods.

Since the terrain is varied, the proposed range supports other migratory bird species common to interior Alaska. Ptarmigan are fairly common, particularly in winter, as well as rough grouse. Black bear and occasionally grizzly bear, wolves and wolverines range throughout the area and the habitat supports a good population of moose. It's an excellent caribou migration and wintering area for portions of the Arctic herd, particularly good beaver and muskrat area. Virtually all other furbearers common to the Interior are found on the proposed Kanuti Range. Mr. Regnart covered the fishery aspects of it, so I'll make one final point here that some of the outstanding values shared in common with the other interior Alaska proposals, the waterfowl, is the ability to be a consistent waterfowl producer. In the times of drought elsewhere, these Interior areas are capable of providing the necessary habitat to accommodate the birds displaced from the other traditional breeding areas in the other provinces. I think I'll stop at this point, thank you.

Mr. Quarles. Any other comments on wildlife?

Mr. Burris. Mr. Chairman, Oliver Burris, Alaska Department of Fish and Game. The Kanuti is a very important area for a segment of the western Arctic caribou herd that has traditionally wintered in that area for many years now. It's so traditional in the area that it's given rise many times to a hypothesis that there is a separate group of caribou actually ranging in the Ray Mountains in there. Anyway, the flats are extremely important for wintering area for caribou. The harvest in the Kanuti area itself is not great on this caribou herd. Those caribou filter through several other areas and they are harvested going to that area. In years when they had open seasons in there, there was some harvest that occured in that area by aircraft in the area that is designated as the wildlife refuge here.

One of the really fantastic wildlife populations that exists there now apparently is mosquitoes. Between the Kanuti and the Koyukuk, we really have some of the highest biomass concentration of mosquitoes in North America and it might get the Canadians to compete with us on this title, but the moose population is generally not high in this area now. Their habitat is good and it remains an important piece of moose habitat for the area and people throughout that area depend upon moose rather heavily. Primarily since the caribou movements are not always as predictable as they might be and the—part of the wildlife, then, falls back on the moose which are much more predictable on an annual basis. Black bear, of course, are consumed for food throughout this general area and any area such as this containing high waterfowl populations is so situated that it's going to unquestionably support a moose calving area. In a moose calving area, you would find black bear and they are in turn important for their own value.

The furbearer situation is much similar to what it was on the Kuyukuk, the difference being that because of th size of this area we find that such things as martin habitat may not be as important in this area and therefore the martin population will not be as significant as they are in many others, but there is a good general spread of furbearing species and there's good utilization existing in this area throughout the years. The access in the summertime in the area, of course, is by boat or by float plane and there are areas within the refuge area that have supported both local and hunting effort from the Fairbanks area and other areas, primarily on moose in the summer and the fall. The moose population is particularly tough in the upper portions of the drainage outside of this. This in the last couple of years has resulted in some additional effort being placed upon the lowland moose populations and, as I mentioned earlier, this does cause conflicts of a different time. And that's all I have, thank you.

Mr. Gordon. One additional comment on these adjacent lakes. These lakes are a fall staging area for rather large numbers of diving ducks, notably the canvasback which is one of the rarer ducks in North America.

Mr. Quarles. Yes?

Mr. Cummings. Ronald Cummings. I just want to go through our traditional uses of this area. Starting with the spring, we go out in May and harvest bear, cranberries and fish, which are a fresh change of diet after all winter. And we use quite a bit of the beaver and muskrat in that area for both the furbearing and eating. In the summer, we harvest blueberries, some wood, birches for our sled and snowshoe and canoe building out of this area. When I talk about this area, I'm talking about both the South Fork, the Fish Creek and the Kanuti River, which is within the proposal. In the fall, we harvest again our mainstay of moose. The major proportion of our moose meat comes from that area. In early fall and early winter, we harvest all of the furbearing animals that are in this area, which is considerable. As with the Gates of the Artic, we have cabins, campsites and Native allotments within the withdrawal. Out of all of the areas, the Kanuti River is one of the richest mainstays of our income and subsistence living. I'd like to see that remain.

Mr. QUARLES. Thank you. Does anyone else wish to speak on wildlife? Yes, Dave?

Mr. WILLIAMS. Two things. I'd like to ask the gentleman from A.D.F. & G. if there have been significant changes in the moose population since the Allakaket burn in 1972 up there?

Mr. BURRIS. Not as significant as what we would have expected to see. Studies this fall and the previous spring indicate that there's other factors that are important for moose population. Therefore, creation of new areas of habitat are probably not going to be occupied by significant numbers.

Mr. WILLIAMS. I was wondering because that was the first place I ever worked in Alaska and I saw up to seven moose on a lake at a time and I saw moose all over the country. I was surprised to hear you felt they were so low. Second, I haven't said too much about subsistence for the week that I've been here. We, as Doyon, do support those subsistence needs of the people who live in the villages, the things that Ron just talked about, and I think that almost any of the flats areas, the Innoko, the Nowitna, the Yukon Flats—you can see use patterns very similar to that in Allakaket and Alatna. I'd like it on the record that Doyon does support these people in their subsistence.

Mr. QUARLES. Anyone else? Yes?

Mr. MULLIGAN. I'd like to ask a question, John Mulligan, Bureau of Mines. Are the hilly areas part of the critical habitat or is the critical habitat largely in the basins and the river valleys?

Mr. BURRIS. Critical habitat by State definition has one connotation and to my way of thinking, it may not have. If you look at the moose populations as a whole or the caribou populations from that standpoint, it's difficult to say any area of this size, therefore, is critical habitat. I think you have to deal more with whether there are geese that may nest in the area or some such. If we're talking about winter concentrations of animals, which areas are most important, then in this area, it's areas along rivers and adjacent to rivers that are very important from the November period through April and the uplands become more important in the late summer and in the breeding season. So it's pretty tough to say which part of a habitat is critical.

Mr. QUARLES. Yes, Bill?

Mr. REFFALT. Bill Reffalt, Fish and Wildlife Service. Again, as the Federal Government has brought up earlier last week, I believe, critical habitat has a very strict definition and I think that has to be kept in mind and so therefore nothing against John's question, it's a good question. Key habitat would be what we would probably refer to and here I would go back to something that Rich Gordon said earlier today. The watershed importance of some of these immediate upland areas cannot be downgraded in any sense. The immediate basins are dependent upon a supply of relatively continuous quality water coming off of those watersheds and damage of those watersheds, whether they are used by the species or not, does become an important thing. We do know that there is a relationship between a number of the species that occupy the basin flats at most of the times of the year. So, if you were to designate key habitats, you'd be down in adjacent to the [indiscernible] situations as the State Fish and Game Department pointed out, but it's one of those ecological situations where you shouldn't overlook the immediately adjacent just because the key is down in the bottom. They're down there because of that watershed.

Mr. BEVINETTO. Let me ask a question of the Alaska Department of Fish and Game. Have you prescribed management goals for the big game species and the species of commercial fish and sports fish?

Mr. BURRIS. We have management goals statewide, yes.

Mr. BEVINETTO. An overall State program?

Mr. BURRIS. We have on all big game species and most of the terrestrial animals and I'm sorry, I can't speak for the fisheries people.

Mr. BEVINETTO. Well, I was just wondering if we could get a copy for the file.

Mr. BURRIS. I believe this has already been introduced to the record.

Mr. QUARLES. Anyone else on wildlife values? Otherwise, the State can address renewable resource values.

Renewable Resources

Mr. WICKES. Jim Wickes, Department of Natural Resources. In terms of agriculture, statewide assessments indicate only 50,000 acres having very low, tenth level agricultural potential within this 1.3 million acre Andrus Kanuti proposal. Forestry resource, again, it's primarily in the ninth level on our scale of ten. It's roughly 900,000 acres, so it's a relatively low potential on both agriculture and forestry.

Mr. QUARLES. Anyone else on renewable resources? Yes?

Mr. WILLIAMS. Dave Williams, Doyon. I guess one more thing I'd like to mention is the local market aspect of some of these, particularly the timber resource, can be important in this area. There was some timber that came off of the South Fork during the pipeline period that went north for pilings and historically, there was a sawmill on the mouth of the South Fork that supplied the open market.

Mr. QUARLES. Anyone else for renewable resources? Would you then, Jim, address the selection situation?

State and Native Land Selections

Mr. WICKES. Again referring to the Andrus Kanuti proposal, State lands comprise 15,000 acres, so those are relatively small holdings. We estimate the final Native holding to be somewhere around 250,000 acres or 19 percent of the Andrus unit. The State has presently no State selection interest areas within the Andrus proposal unit.

Mr. QUARLES. Anyone else that wants to comment on selections? Yes?

Mr. WILLIAMS. One last thing. Throughout the whole thing, we've heard discussions of areas like Sythelymankat and usually I agree with Rich's assessment of the area. I assume that people are not challenging our selections in these areas by virtue of pointing these out and I would like specifically to ask the Coalition, since they're the ones—this is the case, isn't it?

Mr. GORDON. Absolutely.

Energy Resources

Mr. WILSON. Tom Wilson, Alaska Oil and Gas. I think probably I covered my comments in respect to the Koyukuk area.

Mr. QUARLES. Anyone else wish to address Energy resources? Yes?

Mr. HOFFMAN. Barry Hoffman, Alaska Miners Association. Again, we'd like to bring up uranium and I'd like to bring up a couple points. This area is a cretaceous and possibly tertiary basin and does have uranium potential. Also, in the foothills around the basin in some of the larger proposals, there are the young rhyolites that I mentioned before. There are intrusives and there are metamorphics and all these have uranium potential and I know for a fact that if this land was open and available now, there would be industry in this area.

Mr. QUARLES. Anyone else? Yes, Jim.

Mr. WICKES. In terms of the extent of which the Andrus proposal overlies the potential oil and gas basin, we calculate some million acres overlap, but those million acres rank in the ninth level of our scale of one to ten.

Nonfuel Mineral Resources

Mr. QUARLES. Nonfuel minerals? Yes?

Mr. GRYBECK. Yes, Donald Grybeck, U.S. Geological Survey. In the southeast corner, there's a belt to ultramafic and mafic rocks. They do have nickel and chromite potential. In fact, I think this is where the nickel and chromite is coming from. One of my colleagues who did this part of the study has estimated the number of chromite deposits within that belt. There's a 90-percent chance that there are 6 deposits, 50-percent chance there are 20 deposits, and a 10-percent chance there's 66 deposits. Actually, about half this belt is within this particular wildlife refuge. I would like to comment on these particular types of deposits, however.

They're a type of deposit that we talked about any number of times in the last few days. In this case, it's chromite. At the same time, they are clearly uneconomical. That's, I think, a pretty well substantiated assessment. There are none being mined in all of Alaska or in the United States, for that matter. However, they are excellent examples of so-called strategic minerals. Effectively, a strategic mineral is commonly uneconomic and uninteresting 90 percent of the time. About 10 percent of the time, however, it's in critical demand and it has very high often Government subsidized prices associated with it.

Chromite is a good example. Supplies of chromite come from Africa, from South Africa, Rhodesia, and the U.S.S.R. It doesn't take much imagination to see that we could be cut off from those particular supplies. As I say, these are so-called strategic minerals. Tin would be another one. There's no particular tin mining done, but there are a large number of these deposits that have been postulated within this particular reserve.

Most of these types of deposits, apart from chromite deposits, are small. Considering the rest of the area, again, it's permissive for a number of deposits of lead, zinc, possibly uranium, possibly even tin, a number of base and precious metals, on the basis of these small granitic intusions that are coming up in the country. However, if you look at the map, you'll see very little outcrop there, poorly prospected. The industry has done very little work.

Mr. QUARLES. Go ahead.

Mr. SILVER. Just for the record, the United States can no longer purchase chrome from Rhodesia.

Mr. GRYBECK. That is correct. But Rhodesia is somehow still feeding chrome to the world trade. For instance, there was one point where generally they were selling to the Soviet Union and we were buying from the Soviets.

Mr. QUARLES. Yes?

Mr. HOFFMAN. Barry Hoffman, Alaska Miners. Again, we're on a lot of possibilities here. I'd just like to point one out that I know about specifically.

Mr. QUARLES. Certainly.

Mr. HOFFMAN. In the area, there are anomolous gossan zones. They contain copper, lead, zinc, and silver and if the land was open, there probably would be claims in the area right now. This just, again, points out, there's been very little activity out there particularly because a lot of the ground has been barred from mineral entry and this really does have potential and we're talking about the possibility of significant deposits.

Mr. QUARLES. Anyone else? Yes?

Mr. MULLIGAN. John Mulligan, Bureau of Mines. We're starting a study of this area and plan fieldwork for next summer. We'll try to get out a preliminary report, but tied data will not be available until after the summer's fieldwork. All of the upland part of the area is considered as favorable to highly favorable for mineral deposits.

Mr. QUARLES. Thank you. Anyone else on hardrock minerals? Does anyone wish to address the last value in this particular area, transportation and access?

Transportation and Access

Mr. MULLIGAN. This area is now not too far removed from the pipeline and the economics of mining here have changed dramatically.

Wild and Scenic Rivers

Mr. QUARLES. Anyone else? Well, that's the last of the areas we're going to cover. I notice the Heritage, Recreation, Conservation Service is not in the room. We do have several wild and scenic river proposals and if Rich or anyone else would like to address them, now's the time to do it. I count the Melisitna, the Koyuk and we did not, I believe, take up on the first day the Unalukleet. If anyone would like to address any of those, we'd be delighted to hear it.

Mr. GORDON. I thought we had addressed the Unalukleet.

Mr. QUARLES. We may have.

Koyuk River

Mr. Gordon. Anyway, the Koyuk River—Dick Stenmark is the expert on that river. He's not here. Maybe there is somebody in the room that has firsthand knowledge of it, but it is a longer river than most of the rivers on the Seward Peninsula. It has a good moose population. It's a classic example of where the river is forested right along the vicarian zone and therefore it's seasonally very important for moose.

The westernmost edge of the boreal forest in Alaska is along the upper portion of the Koyuk. In regards to this area, I might comment on two things that I forgot to bring up before. The House Subcommittee No. 3 has accepted some minor—very minor boundary changes on the eastern edge of this Bering Land Bridge. This is in the Koyuk area and some of the bog areas immediately adjacent to it. I'd just call your attention to these minor changes as being good improvements in detail on the eastern edge of the Bering Land Bridge boundary. Also, this relates to the river, but it relates to a much wider area and this was not brought out, I don't believe. The Bering Land Bridge proposal, with the exception of one place in the Serpentine Hot Springs, does not include significant gyrfalcon habitat. Let me simply suggest for the committee to consider here, Dave Ruzenal who formerly worked for the ADF&G considered this to be the best overall gyrfalcon habitat in the State, the western two-thirds of the Seward Peninsula, east of the Koyuk River. The gyrfalcon——

Mr. Quarles. I'm a little bit confused. Are you talking about the river itself or are you talking about the Bering Land Bridge?

Mr. Gordon. OK, in this case, I apologize. I'm using the river as an example of the type of habitat that occurs throughout—not just the Bering Land Bridge, but throughout the western two-thirds of the Seward Peninsula. Except for Serpentine, it is not within the Bering Land Bridge proposal. Ruzenal considers the best gryfalcon habitat in the State. What I'm suggesting here is there's a need for some kind of cooperative management plan involving fish and game and the BLM and the State to protect habitat. The Koyuk River is a central location, I just forgot to bring that up.

Mr. Quarles. Well, let me just see. Does anyone have a comment on this river?

Mr. Gravogel. Yes, Carl Gravogel, State Fish and Game. I've been up and down the Koyuk River on several occasions, both by boat and aircraft landing on the bars. In my opinion, it's not what you would classically call a wild and scenic river. The main river itself is rather slow moving, it's drained by a fairly large bog, it has that brown acid color. The one exception to that is the East Fork and that's where most of the salmon spawn. That portion of the river is not very negotiable by either boat or float traffic. It's got a lot of beaver dams on it. It's really just a small creek. The main river itself as you mentioned, has a fair amount of willows along the side. There's very few opportunities to get out anyplace and observe the river from an upper height to really get an overall perspective view. There are some places within a half a mile or so that you can walk from the river and a few bluffs and see the central valley.

In regards to the fishing in the main Koyuk above the confluence of both the Peace River and the East Fork—there's a few greyling in it, very few salmon. The bottom characteristic of the river is primarily sand. It doesn't have the gravel that I associate with most of the clear, crystal streams of the Seward Peninsula and from that aspect, again, comparing it with the other streams that I've been on, it's of a lesser quality if you're considering if for the types of things that most people look for on a float trip. It does represent, as far as vegetation, both tundra and climax spruce. So, if a person was interested from that standpoint, yes, I would say that it would provide that type of experience. But as far as a wilderness experience, one that's enjoyable, the Koyuk River is not one that I would pick for a float trip.

Mr. QUARLES. All right. Yes?

Mr. SMITH. I'm Dave Hederly Smith, the Alaska Miners Association. I wasn't really aware that the Koyuk had even been recommended for a wild river.

Mr. QUARLES. The Koyuk is, just for the record, recommended as an instant wild river in the Metcalf-Udall proposal and it's a study river by the Andrus proposal and the Joint Land Use Planning Commission.

Mr. SMITH. My main comment here is that it will most certainly cut off access to Cape Darby if people can't cross the Koyuk. The proposed transportation corridor from the Andrus district would cross it. My company has numerous mineral prospects, probably fifteen to twenty of them, in the Kigluaik Mountains and Grant Mountains area on State land north of the Koyuk. If we're able to prove any of these, we would want to take our concentrates south to Cape Darby and Golovin Bay area and, again, we'd want to cross that river.

Mr. QUARLES. For the record, what you're saying is that unless a mechanism was allowed to choose an access across that river, it would cut you off?

Mr. SMITH. Right you are. And the other, it the river is as he described it, I could care less whether it's wild or not.

Mr. QUARLES. Yes?

Mr. HOFFMAN. Just one other thing for the record. Barry Hoffman, Alaska Miners Association. Should mention that there are some known, very small, again coal shoals along the river. These have been published in the literature and again, probably just local use, but it hasn't been studied.

Mr. MULLIGAN. John Mulligan, Bureau of Mines. The Koyuk River rises in the southern extreme of the old Fairhaven mining district. It traverses throughout its length an area that's either favorable or highly favorable for mineral deposits and also, toward its lower extreme, traverses the Koyuk Ungalik placer mining district.

Mr. QUARLES. Thank you. Any other comments dealing with the Koyuk?

Mr. GORDON. Just for clarification, I've said this before, that a wild river or a scenic river is not solely chosen in all cases for its recreational value, the classic example of this being certain of the four rivers. Unalakeet and the Colville have higher recreational as well as other values, but several of the others chosen has the key wildlife habitat in the area and that's the primary reason they're chosen, not for recreation. Now, in this case, I'd like to ask Carl one question if I might. When I used to work for A.F. & G., the—Bob [indiscernible] indicated the Fish River as being the best recreational float stream on the peninsula. Now, do you have any comments on that?

Mr. GRAVOGEL. This is by far a much better float river than the Koyukuk in my opinion, but if we were to set our rivers—the wild and scenic rivers for habitat, I think I would prefer one where the moose density is rather higher and that would be the Kuzitrin or the Kougarok where we have a much higher wintering population of moose, perhaps on the order of 500 to 600. The Koyuk only supports 100 to a 150 and the habitat for moose is much less there. If we're going to pick a river, let's pick one, as you said, for the wildlife values—one where we're going to gain the most over the longest period and I don't believe the Koyuk, in my opinion, would necessarily be that one.

Melozitna River

Mr. GORDON. The Melozitna River flows in a somewhat U-shaped configuration around the Ray Mountains. It is more locally glaciated than most of the mountain ranges in the State. On the north side of the Ray Mountains, there's quite a number of glacial features. I really can't say very much about the river in detail except that the lower portion of it cuts through a deep rockwall gorge shortly before it comes into the Yukon River. There's considerable and very spectacular Whitewater River and I really don't know even if there's access to the river or not, but the lower portion is one of the more spectacular whitewater rivers in the Interior of Alaska. May I tie that to the other river in that immediate vicinity?

Mr. QUARLES. Go ahead.

Mr. GORDON. Fine. The other river which relates to it is the rampart section of the Yukon River, which is a type of proposal that replaces the point of this—what used to be the BOR for not recognizing. This is a section of a major continental river, the Yukon which cuts through a rock gorge about 400 feet deep. The mountains or high hills, actually, rise directly above the gorge there. It's very different from the Yukon Charley in that you don't have rock outcrops and rolling mountains that lead your eye back into the mountains. Here you have low mountains that arise very steeply above the river. Perhaps one of the two most dramatic sections of any major, large river in Alaska, the Yukon Charley being the other. It's a gentle river in that section. It's not rapid. It is a very important river for commercial transportation, fishing and so forth. The idea, again, of the scenic river not only for recreation, but to protect the shoreline from incompatible uses. It does have recreational use.

Mr. QUARLES. OK.

Mr. WILLIAMS. Dave Williams, Doyon. A section of the Melozitna will be owned by the people of Ruby. I agree with you. It's a fantastic stream and I don't know that the people of Ruby wouldn't be willing to talk about it. The rampart section of the Yukon—where do you really define it as starting? Maybe at the pipeline bridge?

Mr. GORDON. Where it starts to lead into the canyons, I suppose where the canyon wall really starts to form.

Mr. WILLIAMS. OK. Let's say to Tanana, the Rampart Dam withdrawals will have significant withdrawals along the river there. Then in the area between rampart and Tanana, we have a deficiency withdrawal on the north side of the river and we selected most all of this again with the significant mineralization in the area. Because of the rampart withdrawal which was withdrawn in sections which approximated, as I recall, a 400-foot contour, we couldn't select down to the banks of the river in these townships. We've got another one of these very strange withdrawals like we've got in the Forty Mile area where the Government—opposed to what those of us in the Western United States were used to—private lands were in the bottom and the Government had the uplands and the public couldn't get to the uplands. Now, we've got a situation where the Government's got the bottoms and the private lands are in the uplands and we aren't going to be able to get to our land and that will be a concern through the rampart section of the Yukon. But it is a spectacular—in my mind, that portion the upper Yukon and then the portion down by Ruby where it goes through the gorge is the only parts of the Yukon I like.

Mr. GORDON. There's a question—a rough idea of a 2-mile corridor along the river—what proportion between Stevens Village and Tanana will be either Doyon-owned or village-owned?

Mr. WILLIAMS. I think probably we'll have a minimum of half of the mileage, we being the various corporations.

Mr. QUARLES. We have talked about in-holdings quite a bit. The Wild and Scenic River Act—there's a high percentage of it being non-Federal ownership or private ownership. The act therefore includes a provision for the dealing with the situation in which there is a mix of private and public lands. That in itself is not to say that in any of these rivers ought to be looked at so we don't have resource conflicts and management conflicts. I think just to make this clear again, the Yukon rampart section is proposed as instant in the coalition bill, but this—study by the State Federal Joint Land Use Planning Commission. The Andrus proposal does not cover the rampart section. In H.R. 39, it is proposed as instant and under study in the Andrus proposal. Any others on either of these two rivers? Yes, go ahead.

Mr. HOFFMAN. Barry Hoffman of Alaska Miners Association. I'd like to comment on both of the rivers. Instead of going into detailed talk on the mineral potential along the Melozitna River, which is considerable, I'll just list a few of the commodities or the potential commodities. There has been staking for uranium, very close to it. There is uranium potential in the river itself. There are base and precious metal possibilities in the area. There are some coal occurrences along the river and close to the river. Again, this coal would be for local use and again, it's one of these areas that has received very little attention by industry in the past, but which right now is receiving quite a bit of attention.

This area has also been identified as an area for high uranium potential by several agencies of the Federal Government and I'd also like to address the possibility of access across the river in addition to the mineral potential on the river banks itself. This might be very important to get some provision in for future access corridors across the river. On the rampart section of the Yukon, I think Doyon has already mentioned that they have mineral shows there on the north side. The south side also contains some mineral potential. Again, it's very difficult to explore in the area, particularly just back away from the river. There is some exposure along the river, but you get back away from the river and it's quite densely forested. Another point I would like to make is that the possibility of transport and landing machinery along the river to get access into mineral properties and actually having access to the river banks: It might make a lot more sense to build a road from the Alaska pipeline or at least a preliminary road to have access from the river up and it might cause quite a bit less damage.

Mr. QUARLES. Yes?

Mr. MAUER. Fran Mauer, U.S. Fish and Wildlife Service. The rampart section of the Yukon River has been identified by the peregrine falcon recovery team as a historic peregrine falcon nesting area and identified as a possible habitat for reintroduction of peregrine falcon to implement their plan. The Melozitna River, like many other rivers in the Koyukuk area, is an important white-fronted goose brood rearing area, also.

Mr. QUARLES. Does anyone else wish to address any of these rivers? Is there any other river that anybody would like to address?

Mr. MULLIGAN. John Mulligan, Bureau of Mines. I'd just like to state that the lower part of practically the entire part of the Melozitna River is considered highly favorable for metallic minerals.

Mr. QUARLES. Thank you. Anyone else? Any other thing of interest? Well, in that case, this long marathon will come to a conclusion. Once again, we invite anyone to submit their address for the hearing record, once published, or to address——

Mr. BEVINETTO. I'd like to express my personal thanks to you and Mike and Tom for setting the format of the meeting which really, I think, fills the charge given by the Senators, that we do come and arrange a workshop that would be a free expression of the facts. All of the materials gained here, I think, will be of use to me and I wish to really comment and express my appreciation for the expert and professional quality of the testimony given here with a low heat factor, as observed, and with a great deal of love for what you're doing and I hope I can carry that back to the people I'm responsible to and again, I certainly thank you all.

Mr. QUARLES. OK, I'd like to second that both for the valuable information you've provided us and the way in which it's been provided. I also want to compliment everybody for showing one extraordinary attribute which is unbelievable patience. It's a long and sometimes very time-consuming process, but I believe it will be valuable to us. I would like to thank both Tom and Tony for keeping us on our toes and watching that we don't make mistakes here in this process. They've been a valuable source of information.

Mr. SILVER. I would be remiss on behalf of Senator Stevens if I didn't also thank the committee staff, particularly for coming to Alaska and holding these meetings here with the people of Alaska who are able to present their information. It's been one of Senator

Stevens' concerns throughout that the information get to the committee through the people who know it best and those are Alaskans rather than others who also have a great aptitude and in many cases have knowledge of the State, as well. I think the important thing beyond the actual format was that this meeting was held in Alaska.

MR. FANKHAUSER. Bob Fankhauser on behalf of Alaska Miners Association. We would also like to extend appreciation for being able to comment. I hope you all don't think we're too bad. [General laughter.]

Mr. QUARLES. Not at all. Your information has been very valuable.

Mr. WILSON. On behalf of the Alaska Oil and Gas Association, I'd like to thank you for inviting us.

Mr. QUARLES. Before anyone else thanks us, I'll assume that everyone else is thankful.

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